

The Only Weekly Mining Paper in the Union and Rhodesia.

THE  
South African  
MINING JOURNAL

WITH WHICH IS INCORPORATED  
"The South African Mines, Commerce & Industries"

ESTABLISHED 1891

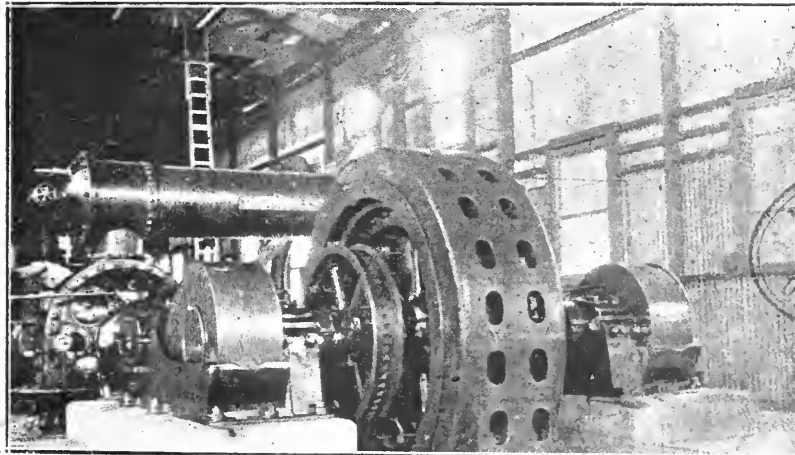
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VOL. XXVI., PART II. No. 1339.] THE SOUTH AFRICAN MINING JOURNAL. MAY 26, 1917. [WEEKLY, PRICE 6d.

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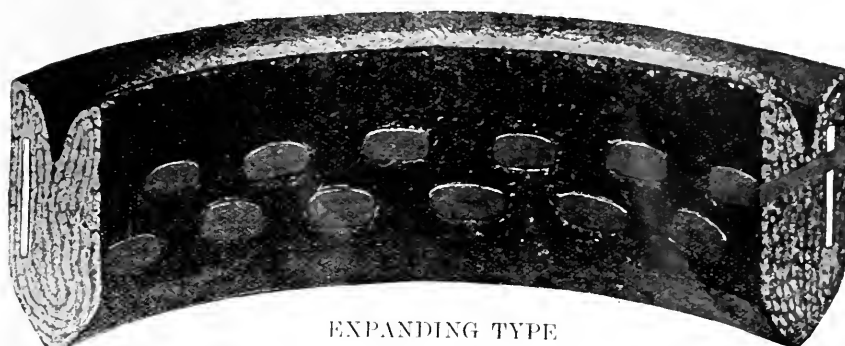
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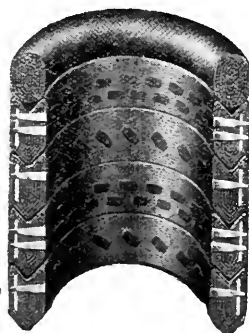
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Phone 2225. Telegraphic Address: "Edloug, Johannesburg."

Code: Imperial Combination and A.B.C. (5th edition).

Reference: The National Bank of South Africa, Limited, here  
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2 Crushers, Blake Marsden,  
Tangye Winder, 24in. x 11in.,  
6ft. drums.

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Tangye Driving Engine, 16in.  
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Tangye Driving Engine, 8in.  
x 14in.

Tangye Driving Engine, 16in.  
x 26in.

Sirocco Fan, 24in., 9in. delivery  
10 tons 7in. Oct. Drill Steel.  
5½d. lb.

10 tons Cast Tool Steel, 1d. lb.  
100,000 feet Piping, 1in. to 8in.  
Second-hand Timber and Iron  
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(Incorporated in the Transvaal.)

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A. I. Schmidt, C. Pakeman, Consulting Engineer; D. Wilkinson, Manager; Arthur J. Jones, Secretary; H. G. L. Panchaud, London Secretaries; Downes, Munns and Co., Head Office; Cullinan Buildings, Johannesburg; London Office: Salisbury House, London Wall, E.C.

## REPORT OF THE DIRECTORS

For the Year ended 31st December, 1916.

Submitted at the Twentieth Ordinary General Meeting of Shareholders, held in the Company's Board Room, Cullinan Building, Johannesburg, on Friday, the 11th May, 1917, at 11 a.m.

To the Shareholders,

KNIGHT CENTRAL, LTD.

Gentlemen,

Your Directors beg to submit their Report for the year ended 31st December, 1916, together with the Reports of the Consulting Engineer and the Manager, and the Financial Statements made up to that date.

### PROPERTY.

There has been no change since the last General Meeting in your Company's holding, which comprises 897 claims on the farm Driefontein, equal in area to 895,377 claims, besides two stands and a water-right.

### MINING OPERATIONS.

The Reports of the Consulting Engineer and the Manager deal fully with the work accomplished.

During the year 322,000 tons of ore were milled for a profit of £23,205, as compared with 326,060 tons during 1915 for a profit of £45,433.

The payable ore reserves at 31st December, 1916, amounted to 296,800 tons, with an average assay value of 5.35 dwts. over 63 inches, showing a decrease of 109,600 tons, with a fall in value of 0.19 dwt.

### FINANCIAL.

The Appropriation Account may be summarised in the following manner:—

Balance brought forward from December 31, 1915 ..	£134,888 12 3
Less—Audit Fees .. .. .	210 0 0

	£134,678 12 3
Profits earned during 1916 .. .. .	23,205 1 4
Interest and Sundry Revenue .. .. .	1,097 13 6
	£161,981 7 1

Less—	
Capital Expenditure during 1916 ..	£51,440 16 11
Contribution to Miners' Phthisis ..	
Compensation Fund .. .. .	3,021 10 3
English Income Tax .. .. .	547 16 0
	55,013 3 2

Leaving a balance of .. .. .	£106,968 3 11
------------------------------	---------------

The following items of Capital Expenditure have been incurred during the past year:—

Buildings .. .. .	£10,677 1 3
Machinery and Plant .. .. .	7,973 6 8
Shafts .. .. .	33,652 4 6
	£52,302 12 5

Less—

Livestock, Vehicles and Harness, and Furniture written off ..	£191 10 0
Investments sold .. .. .	367 5 6
	£861 15 6

£51,440 16 11

### EMPLOYEES ON ACTIVE SERVICE.

During the year 62 of the Company's employees have been on active service with the Forces in German East Africa and in Europe; and your Directors have to record with deep regret the death of two of these, viz., Mr. W. Dodds and Mr. D. Robertson.

### STAFF.

Your Consulting Engineer, Mr. D. Wilkinson, having been granted five months' leave of absence to Europe, Mr. P. M. Newhall was appointed to act for him. Your acknowledgments are due to both these officials, and to the Manager, Mr. A. J. Jones, and his staff for the able and zealous manner in which they have carried out their duties during the past year.

### DIRECTORATE.

You will be asked to confirm the appointment of Mr. A. F. Mullins as a Director of the Company in the place of Mr. Max Honnet, resigned.

In accordance with the Company's Articles of Association, all your Directors, viz., Messrs. W. H. Dawe, E. A. Wallers, R. R. Hollins, J. Jolly, A. G. Gill, F. R. Lynch and A. F. Mullins, retire from office, but, being eligible, they offer themselves for re-election.

### AUDITORS.

You will be asked to fix the Auditor's remuneration for their past services, and to appoint Auditors for the current year in place of Messrs. C. L. Andersson & Co. and Mr. Charles Stuart, who being eligible, offer themselves for re-appointment.

We are, Gentlemen,

Obediently yours,

A. G. GILL, Acting Chairman.

A. F. MULLINS.

F. R. LYNCH.

S. M. NELSON.

G. W. HOLLINS.

W. H. B. FRANK.

R. R. HOLLINS.

Directors.

Johannesburg,  
20th February, 1917.

## Knight Central, Limited.—continued.

Dr.	BALANCE SHEET, 31st DECEMBER, 1916.	Cr.
<b>To Capital—</b>		
900,000 shares of £1 sterling each, fully paid	£900,000 0 0	
.. Share Premium Account—		
As per last Account	238,165 12 6	
.. Funds Transferred from Appropriation Account—		
As per last Account	196,622 17 3	
For Capital Expenditure for year ended 31st December, 1916	51,440 16 11	
	<u>248,063 14 2</u>	
	£1,386,229 6 8	
.. Sundry Shareholders—		
Dividends unpaid	126 18 9	
.. Sundry Creditors, etc.	20,576 16 9	
.. Development Suspense	1,500 0 0	
.. Balance—		
Appropriation Account	106,963 3 11	
<b>Contingent Liabilities on Shares, etc.—</b>		
Rand Mutual Assurance Company, Limited.—144 shares at £4 per share	£576 0 0	
Witwatersrand Native Labour Association, Limited.—606 shares at 8s. per share	242 8 0	
Witwatersrand Co-operative Smelting Works, Limited.—876 shares at 12s. per share	525 12 0	
Native Recruiting Corporation, Ltd.—Deposit of 13s. 6d. per native un called on complement of 2,869 natives	1,936 11 0	
	<u>£3,280 11 6</u>	
	£1,515,401 6 1	
<b>By Property—</b>		
As per last Account	£295,954 17 9	
.. Buildings	92,217 16 10	
.. Machinery and Plant	409,509 2 11	
.. Shafts—		
East	£177,305 4 2	
West	156,407 3 2	
Loading and Pump Stations	53,829 12 2	
	<u>367,541 19 0</u>	
.. Mine Development	193,079 12 9	
.. General Surface Works and Dams	3,930 19 0	
.. Livestock, Vehicles and Harness	352 9 7	
.. Furniture	346 9 4	
.. Investments—		
Victoria Falls and Transvaal Power Company, Limited.—3,500 Preference shares of £1 each, fully paid, at cost	3,500 0 0	
Rand Mutual Assurance Company, Limited.—144 shares of £10 sterling each, £5 paid up	1,664 0 0	
Witwatersrand Native Labour Association, Limited.—606 shares of £1 sterling each, 12s. paid and 25s. per share deposit	1,121 2 0	
Witwatersrand Co-operative Smelting Works, Limited.—876 shares of £1 sterling each, 8s. paid	350 0 0	
Native Recruiting Corporation, Ltd.—28 shares of £1 each	£28 0 0	
And deposit in respect of native complement	932 8 0	
	<u>960 8 0</u>	
	11,705 18 0	
	<u>£1,394,729 6 8</u>	
.. Bearer Share Warrants	422 9 0	
.. Stores on hand	51,503 13 10	
.. Sundry Debtors, Payments in Advance, etc.	7,986 11 7	
.. Gold Consignment Account	15,389 9 1	
.. Cash—		
Current Account, Johannesburg	5,845 11 11	
Current Account, London	226 11 0	
Dividend Accounts, Johannesburg and London	126 18 9	
Fixed Deposits, less amounts drawn	40,250 0 0	
Cash at Mine	920 14 3	
	<u>45,369 15 11</u>	
	<u>£1,515,401 6 1</u>	

NOTE.—No provision has been made for the following:—Government Tax on Profits for the year ended 31st December, 1916; Special War Levy and Income Tax, London.

H. G. L. PANCHAUD, *Secretary*.A. G. GILL, *Acting Chairman*.

A. F. MULLINS

G. W. HOLLINS,

*Directors.**To the Shareholders of the**Knight Central, Limited.*

We have audited the Balance Sheet of the Knight Central, Limited, dated the 31st December, 1916, above set forth, and have obtained all the information and explanations we have required. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the Company's affairs to the best of our information and the explanations given us, and as shown by the books of the Company.

C. L. ANDERSSON & CO.,  
Incorporated Accountants (Engl.)CHAS. STUART,  
Chartered Accountant.*Auditors.*

Johannesburg, 2nd March, 1917.

## Knight Central Limited.—continued.

## Dr. Revenue and Expenditure Account for the Year ended 31st December, 1916. Cr.

By Mining Expenses—	£61,236 0 0	By Gold Account—	
Heading Expenses	34,195 5 6	Mill 61,811 419 fine ozs. from 322,000	
Development Expenses	42,726 2 10	tons crushed	£257,235 15 6
Milling Expenses	26,051 4 0	Cyanide—19,371 750 fine ozs. from	
Underground Tramming & Shovelling	40,998 2 6	323,223 tons treated	30,512 17 9
Mine Pumping	11,372 14 7		£327,746 12
Underground Administration	15,594 12 2		
Surface Ore Transport, Crushing and Sorting	5,623 11 5		
Cyaniding Expenses	21,556 10 9		
General Mine Charges	23,754 9 11		
	£301,830 1 11		
Charges—			
Claim Licences	3,963 15 6		
Salaries—Directors' and Consulting Engineer's Fees	5,800 0 6		
Offices, Telegrams, Postages, Stationery, Printing, Advertising, Legal Expenses, Exchange, Commission and General Charges	1,637 16 3		
Profits Insurance	106 13 6		
London Office Expenses (including London Committee Fees)	1,205 2 4		
	12,763 9 6		
Balance			
To Appropriation Account	23,205 1 4		
	£337,798 12 9		£337,798 12 9

## Dr. Appropriation Account, 31st December, 1916. Cr.

By Auditors' Fees—		By Balance—	
For year ended 31st December, 1915	£216 0 0	Brought forward from 31st December, 1915	£134,600 12 3
Expenditure on Capital Account—		.. Balance—	
For Capital Expenditure during year ended 31st December, 1916	51,446 16 11	From Revenue and Expenditure Account, being profit on working for the year ended 31st December, 1916	23,205 1 4
Contribution to Miners' Phthisis Compensation Fund	3,024 10 3	Interest	3,253 5 9
Income Tax Paid in London	517 15	.. Dividends, etc.—	
Balance—		Received on Victoria Falls and Transvaal Power Company, Limited, Preference shares to 31st December, 1915	754 7 6
To Balance Sheet	106,968 3 11	Received on Witwatersrand Co-operative Smelting Works, Ltd., shares	£21 0 0
		Refund of unappropriated balance of profits	68 19 9
			96 0 3
			844 7 9
	£162,191 7 1		£162,191 7 1

H. G. L. PANCHAUD, *Secretary*.A. G. GILL, *Acting Chairman*.

A. F. MULLINS,

G. W. HOLINS,

*Directors*

Examined and found correct.

C. L. ANDERSSON & CO.,  
Incorporated Accountants (Eng.).CHAS. STUART,  
Chartered Accountant.*Auditors*



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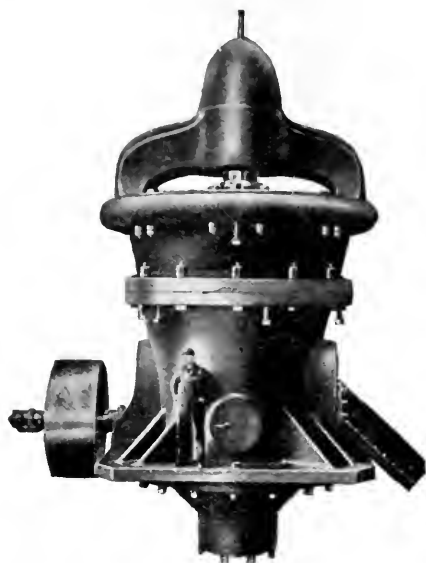
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THE SOUTH AFRICAN

*Mining Journal,*

WITH WHICH IS INCORPORATED

South African Mines, Commerce and Industries.

ESTABLISHED 1891.

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## CONTENTS.

PAGE

Notes and News	291
Topics of the Week:	
The Union Industrial Census	293
Knight Central: Consulting Engineer's Report	294
Some Aspects of the Transvaal Coal Trade	295
Coal in Angola: Some of its Products	296
Engineering Students in Union Government Employ...	297
Comparison of Stamp Milling Costs between Californian and Nissen Stamps at Modder B.	297
S.W. Transvaal Diamond Output	298
Industrial Census: Detailed Regulations	299
Working Conditions on Transvaal Mines	300
Tungsten in Rhodesia	301
Metallurgical Problems of the Rand—I.	303
Good Hope Tin Mines	304
New Patents	304
The Week in the Sharemarket	305
Engineering Notes and News:	
Notes on Mining Ropes	307
The Week in the Mining Material and Engineering Trades	309
The Week's Meetings: Knight Central	318

## Notes and News.

The Randfontein trouble ended satisfactorily early this week. In response to a message from the **The Randfontein Mines Department**, the men decided on **Trouble.** Tuesday to negotiate with the directors of the Barnato group again, but not to resume work. Later, the directorate met the delegates of the Mineworkers' Union and strikers. After a prolonged conference, the directorate conceded an increase in wages to 18s. 4d. for six skipmen, and to 16s. 8d. for two others, and undertook that there should be no victimisation, and no break in the continuity of service for holidays. The only demand not accepted was that the men should be paid for the days they were on strike, it being pointed out that no opportunity had been afforded the management to consider the points raised. It was further decided to have another meeting within seven days to discuss complaints, the conference to be continued in its present form. With only two or three dissentients the men accepted the decisions, and work resumed on the following day.

\* \* \* \*

In the course of an interesting paper on the Natal Coalfields, read at a meeting of the Chemical and Metallurgical Society, Mr. W. T. Heslop **The Natal Coalfields.** dwelt on the matter of wastage, and stated that the question whether any colliery should be allowed to waste national assets, which could never be replaced, was one of paramount importance. South African was by no means so rich in coal as was formerly supposed, and even if an individual shirked his duty to future generations the national spirit would sooner or later recognise the national responsibility towards posterity. Coal was being wasted to-day in South Africa in a manner that no British royalty owner would for a moment permit in one of his mining leases. The British royalty owner had only his family to consider; South Africa had its responsibility to the future of the nation. To prevent such waste by prohibitive legislation was by no means an easy problem. Questions of the payability of seams and, more particularly, of what constituted waste, were by no means easy. A special tax on wasted coal or, preferably, a tax on the output wherever workable coal was being wasted, would be somewhat simpler and more practicable. The difficulties would be great, but such as they were they had been in practice overcome by British royalty owners.

\* \* \* \*

Mr. Edgar Crammond explained at the Institution of Civil Engineers recently how it was not until the 'Thirties of last century that Great Britain began to export capital on a large scale. In recent years the amount grew rapidly, and the income received from investments abroad grew in proportion. The Inland Revenue returns do not "earnmark" all such income, but the official figures indicate an enormous growth since 1900, for the total of that year was £60,000,000, while the total of 1911 was nearly £182,000,000. Some allowance, no doubt, must be made for the more accurate tracing of sources; but a large amount is still unidentified, and Mr. Crammond reckons the total income from overseas investments at £200,000,000 a year, which is the figure that has generally been adopted by financial experts. Curiously enough the capital invested is divided almost equally between the Empire and foreign countries, the first having some £1,770,000,000 and the second £1,784,000,000. India, Canada, Australasia and Africa may be put down for a little over £100,000,000 apiece. If British surplus money first flowed into Europe, the current soon changed, and the stream of wealth poured into distant lands—Canada, Argentina, Chili, and so on. This change was due to the influence of shipping, which carried British capital, in the form of machinery and other manufactured goods, and not in gold and silver, wherever they were most

wanted. They went abroad, indeed, to develop new countries. All over the world British capital has been sunk in railways, irrigation and waterworks, mines, harbours, rubber plantations, etc. It has gone, in a word, to increase the supplies of food and raw materials, and, in addition, these supplies have been made accessible to the whole world. In all that concerns the export of capital, shipping, Mr. Chamberlain maintains, plays a predominant part, and whatever may be done in other directions after the war, British ship-owners "should be free from legislative interference." It may be said that hitherto an unrestricted internationalism guided British investments, that "we opened our money market to the whole world, and that we became dependent on Germany for some vital products." "Nevertheless," Mr. Chamberlain argues, "our investments were directed wisely on the whole," and as the past two years have proved, our real war treasure lay in our investments abroad. In order to pay for munitions and food we have been selling these investments to the United States; at the same time we have been lending vast sums to our Allies and to the Dominions, so that the total of our foreign investments has not decreased, though their real value may be less."

\* \* \* \*

The increased demand for coal in this country after the war, which appears to be anticipated by those

**Transvaal Coal Mining Progress.** who have studied coal movements for some time past, together with the possibilities of an overseas trade of considerable dimensions as the result of the disorganisation of the trade in Europe during the last two years or so, has led to the display of considerable activity in the Transvaal coal area. To a certain extent the open market for South African railway orders and the transfer of capital from less favourable mining centres has helped to increase the enterprise that has developed in this part of the Union. Among the latest areas to lay claim to consideration as sources of coal supply is that lying between the Springs and Bethal districts. Doubtless on account of the proximity of the railway line, a good deal of interest has been taken in this district, which possesses the advantage of lying within comparatively easy reach of the Witwatersrand. The existence of coal measures there has, of course, been a matter of common knowledge for many years, but the former inaccessibility of the field and the somewhat indifferent results obtained in shallow boreholes, even after the railway had encouraged the commencement of exploratory work, combined to retard the opening up of an area which was otherwise well situated. More recently, however, some of these boreholes have been deepened, with results that are very gratifying. Near Leslie station, on the Johannesburg-Bethal-Breyten line, two boreholes have been put down to depths between 300 and 400 feet. One of these has struck an upper seam of coal at a depth of 315 feet, with a thickness of 3 feet. On continuing this bore, a second seam, 6 feet thick, was found at a depth of about 391 feet. The hole was continued for another 8 feet 3 inches, and remained in coal measures, and it is considered not unlikely that a third seam may be discovered in depth. In a second borehole, a mile or more distant from the first, the upper 3 feet seam was met at a depth of 236 feet 10 inches, while the lower seam, 8 feet in thickness, was encountered at 311 feet 6 inches, together with a seam of carbonaceous shale 3 feet 3 inches thick. The main coal is of excellent quality throughout, without shale bands, so that the operation of sorting would be reduced to a minimum, while the thickness of the seam would allow of very economical working. It is said that the shales and sandstones which overlie the coal are of a kind that is not found in the Witbank, Oogies and other coal working districts, and for this reason it is supposed that the boreholes are located in a higher horizon of the coal measures than that which prevails generally in the Transvaal coalfield. Several farms have been taken up for exploratory purposes in this neighbourhood, which is about 60 miles due east of

Johannesburg, and midway between the Pretoria-Dealgos Bay and Johannesburg-Durban main lines of railway. If the quality of the coal which has been found in the boreholes is proved to be characteristic of the whole area that has been taken in hand for exploratory purposes, a new centre of some importance should be added to the list of those which are already active and profitable producers.

\* \* \* \*

In March last Sir Albert Stanley announced that steps were being taken in the direction of the formation of an undertaking to be known as the **British Trade Bank**, the principal object of which would be to establish a trade credit bank connected with existing banks, for the purpose of developing British trade abroad. In the House of Commons recently, Sir Albert Stanley gave the details of the venture. He said that the corporation would have a capital of ten millions sterling. It was proposed to raise two and a half millions, and it was necessary that one million should be subscribed before the prospectus was issued. He had interviewed representative bankers, and explained the scheme to them, and asked for their support. The banks were practically unanimous in support of the scheme, although he could not say all of them were equally enthusiastic in agreeing to subscribe capital. A number of the larger banks had subscribed towards the million which was necessary to launch the scheme. The Government did not propose to subscribe capital or subsidise the undertaking in any way. He believed the corporation would serve a very useful purpose. In the course of the debate the scheme was strongly criticised and the terms of its charter were attacked. Mr. Chamberlain promised that the Government would reconsider the matter in the light of the criticisms, but he was unable to promise to revise or withdraw the charter.

\* \* \* \*

The annual report of the Transvaal Landowners' Association is, as usual, full of important matter, **Land Settlement**, which we hope to deal with in future issues. In regard to the question of land settlement it has the following:—"There is again very little progress to report in the extension of the area under white occupation in the Northern Districts, nor is any material improvement in this direction to be looked for until the war is over. A deputation from your Committee met the Minister of Lands in August last on the question of land settlement for returned soldiers, when it was pointed out that your members' properties were practically all situated in the Bush and Low Veld, and they owned no unoccupied properties to speak of in the Highveld. The Minister of Lands arranged with this deputation to embody his views and state his requirements in a letter on which your Committee could base its enquiries to members, and your Committee is still awaiting the receipt of this letter. Your Committee further issued a circular to members in August last, in which it was proposed to revise and republish the Association's handbook of farms for sale or lease, the idea then being that such a book, if issued about the time of the conclusion of the war, should prove of service to those on the look-out for land in this country. In connection with the proposed publication, your Committee will have to take notice of the effect of the Schedules of the Native Land Act Commission, from which it appears that the Government proposes to include about  $1\frac{1}{2}$  million acres of your properties in the native areas, some of which land would in the ordinary way have been included in the handbook. Until the boundaries of these areas are definitely decided upon, it is obviously inadvisable to advertise any such land as open for European occupation. In your Committee's opinion caution is now necessary on the part of members when offering for sale or lease land likely to be affected by the proposed native areas. The unoccupied farms within the agency at the end of 1916 belonging to members and non-members numbered 1,066. In addition to this, the Government owns an enormous extent of unoccupied country in the same districts."

The annual report of the Transvaal Landowners' Association

proceeds to set out the reasons for so large a portion of the country remaining unoccupied. They are (1) The physical impossibility of the existing small white population of the Union occupying the large area within its boundaries. (2) The lack of sufficient men with the necessary capital. (3) Coloured competition and the unfortunate results from popular sentiment amongst whites regarding manual labour. (4) The absence of adequate water supplies for irrigation and for stock and domestic purposes. (5) The absence of the organisation and co-operation necessary amongst farmers for: (a) Pooling produce for sale and for the sake of obtaining better credit and the best rates for produce and stock; (b) improving the class of stock; (c) insisting on the strengthening and strict enforcement of regulations dealing with stock and crop disease. (6) The want of railways and better roads, the need of telephones and other conveniences of civilisation, and the drawbacks inseparable from the isolated life the farmer of the backveld is compelled to face. With regard to land generally, your Committee would point out that, judging from some of the statements recently made in Parliament, the opinion is held that land companies are expected to sell or lease their land upon purely philanthropic lines, and it seems it desirable therefore to emphasise the fact that, whereas the Government may be and often are influenced by outside considerations affecting the general welfare of the State, companies can only deal with their properties on business lines and in the best interests of their shareholders. A point of fundamental importance in connection with land settlement, and which the public is apt to overlook, is the impracticability of establishing settlers on the greater portion of the land available unless they are possessed of the necessary capital, to embark upon stock farming for which your land in the northern areas is specially adapted. It is usually a simple matter to arrange for the purchase or lease of land on easy terms, but a tenant without sufficient capital would more often than not fail if he attempted to farm without adequate resources. The utmost caution is therefore necessary before advising settlers to take up land, unless they have sufficient means.

\* \* \* \*

According to the quarterly report of the E.R.P.M. for the

**The E.R.P.M.  
Position.**

period ended March 31, the actual expenditure on development amounted to £42,210 16s. 4d., as against £51,462 10s., provided in the working costs (at 2s. 5½d. per ton milled), leaving a balance of £9,251 13s. 8d., which, added to the balance at 31st December, 1916, of £357,365 12s. 10d., gives a total of £366,617 6s. 6d. standing to the credit of development suspense at 31st March, 1917. Company's debentures to the nominal value of £1,520 were purchased during the quarter. The new source of water encountered in the 27th level crosscut south from the Angelo Deep west shaft has been partially shut off by a dam at the northern end of the crosscut, only about 600,000 gallons per day being allowed to pass this dam to the pumps. Work on both this crosscut and the one from the Angelo Deep east shaft has, however, been entirely suspended during the quarter. M. Francois, the inventor of the process for sealing off water-bearing fissures—a full reference to which was made in the annual report recently issued—arrived at the end of March with two assistants. After a careful study of the position he has expressed himself fully confident that his process will prove entirely successful wherever applied, including the main incline shafts. On arrival of his plant, which has been delayed, the efficacy of his process will be demonstrated on the 26th level crosscut, and, if successful, the sub-vertical scheme will be pushed ahead with all possible speed. It is anticipated that during the current year the tonnage mined from payable ore reserves month by month will show a steady decrease, owing to the fact that considerably less tonnage continues to be developed than mined, and the number of payable faces available therefore continually grows less. The ever-increasing cost of mining supplies, attributable to the war, continues to press extremely heavily upon the company.

## TOPICS OF THE WEEK.

### THE INDUSTRIAL CENSUS.

OFFICIAL notification has been given in the *Government Gazette* of the intention to take a census next month of factories and other industrial enterprises in the Union. It is hardly necessary to emphasise the importance of the undertaking. The legislative machinery for dealing with it was furnished by the Union Statistics Act of 1911, although, for various unavoidable reasons, the actual promulgation of the measure could not be effected until 1st April of the present year. Under its provisions the Acting Director of Census and Statistics, Mr. C. W. Cousins, is empowered to take an annual census, not only of such industries as may be included in the present census, but of agriculture; rates of wages; conditions of employment; cost of living, and a variety of other matters bearing upon the social and material resources and conditions of the Union. Section 1 of the Act gives a fairly comprehensive list of such matters; and others may be added if required. To give full effect to the policy which the Act embodies must necessarily be a matter of time, but as far as possible its provisions are being put into operation, and the forthcoming census of productive industries marks another and important step towards securing the results so much to be desired. It remains for those at the head of our industrial undertakings to co-operate with the authorities to the utmost of their power in rendering the returns called for. The onus is placed upon the manager or proprietor of every establishment employing not less than four persons (including the manager) or employing fewer persons, but using some motive force (electric, steam, water, wind, or produced from or by any means other than by hand or foot), to obtain and render (not later than the 30th June next) to the "Supervisor of Census, care of the Magistrate of the District, or direct to the "Director of Census and Statistics, Pretoria," a full return as to the value of land, buildings and machinery used in the business; the number of employees, wages paid, light and fuel consumed, the value of materials used, the value of output, and other matters enumerated in the prescribed form of return, a copy of which it is incumbent upon the proprietor or manager to procure from either of the above officers. Such other measures as may be found possible will be taken to bring the matter to the notice of the persons covered by the census, but these will not relieve them of their obligation in the matter of obtaining the form and rendering the return, failure on their part being visited with certain penalties. Any communication addressed to either of the above officers, the envelope being headed "Statistics: On His Majesty's Service," will secure free postal service. We have been specially requested to emphasise in the clearest possible terms the fact that every officer employed under the Statistics Act is pledged under severe penalty to absolute secrecy, and that any information given in the strictest sense confidential as applying to individual establishments. It may not be divulged by the Director of Census even to a Minister of the Crown, nor to a Court of Law (except in a prosecution of a person who makes default in a return under the Act), nor to a member of the Statistical Council constituted under the Act. The figures will be published only in a cumulative form for all establishments of each particular class, and individual firms may rest assured that the plain intention of the law to protect them will be most carefully observed. Thus it is hoped that it will be possible to obtain the ready co-operation and active interest of all concerned, and reduce to a minimum the element of compulsion enforced by the Act through certain provisions regarding prosecutions and penalties which are laid down.

## KNIGHT CENTRAL: CONSULTING ENGINEER'S REPORT.

The report of Mr. D. Wilkinson, Consulting Engineer of the Knight Central for the year 1916 is as follows:—The results of the last year's operations are given in detail in the manager's report, and are, on the whole, disappointing. The following is a comparison of the yield, cost and profit for the last three years: 1914: Tons milled, 281,960; yield per ton, 22s. 2 21d.; costs per ton, 19s. 2 20d.; profit per ton, 3s. 0 01d.; total profit, £42,753. 1915: Tons milled, 326,090; yield per ton, 21s. 10 06d.; costs per ton, 18s. 6 62d.; profit per ton, 2s. 9 14d.; total profit, £45,133. 1916: Tons milled, 322,000; yield per ton, 20s. 11 78d.; costs per ton, 19s. 6 18d.; profit per ton, 1s. 5 30d.; total profit, £23,295. The yield being 1 28d. per ton lower, and the cost 11 86d. higher, the result is a reduction in the total profit of £22,228. The increase in the costs is due chiefly to the greater development and hoisting charges and the increase in the cost of stores and additional charges caused by the war. The decrease in the value of the yield is due to the larger percentage obtained from reclamation. The development footage, exclusive of shaft sinking, amounted to 12,363 feet, an increase of 502 feet as compared with 1915, but this resulted in an exposure of only 90,160 payable tons as compared with 218,100 during 1915. The ore reserves are estimated at 296,800 tons, having an average assay value of 5.35 dwts. over a stopping width of 63 inches, this being a decrease of 109,600 tons, and a fall in value, as compared with the 31st December, 1915, of 0.19 dwt. The footage driven, crosscut, raised and sunk, south of the dyke, was 7,010 feet, as compared with 3,537 feet during 1915. Of this footage, 3,505 feet was sampled, and gave an average of 3.6 dwts. over an estimated stopping width of 72 inches. An estimate based upon the latest information concerning the strike of this dyke indicates that there are about 635 claims south of the dyke, of which 29.2 claims have been explored. The exploratory work to date

south of the dyke may be briefly stated as follows:—Incline subsidiary drift, 1,511 feet; drives, crosscuts, raises and winzes, 17,326 feet; main crosscuts, 2,711 feet. The distance explored on the strike is about 2,850 feet, and on the dip of the reef about 1,100 feet. Driving has been done on six levels from the 13th to the 18th inclusive. About 11,200 feet has been sampled, giving an average assay value of 3.0 dwts. over a stopping width of 62 inches. Owing to the patchy occurrence of payable values, it has not hitherto been possible to include any payable blocks south of the dyke in the ore reserves, but as at the end of December, 1916, 25,700 tons, having an average assay value of 5.73 dwts. over 65.3 inches, have been included. It is estimated that there is an additional 20,000 tons partially developed, which will probably be found, on further development, to be payable. The exposure of so small a payable tonnage for such an enormous amount of development, extending over a period of four years, is striking evidence of the extremely disappointing nature of the reef exposures south of the large dyke. This is shown graphically on the plan attached to the report. The policy of sinking the subsidiary inclines, in order to test the reef values in depth, has been continued throughout the year, and crosscutting is now in progress at two points on the 19th level, but the reefs have not yet been intersected. Although a number of good assays have been obtained on the 17th and 18th levels, and there is, in this respect, a slight improvement in depth, the reefs, on further exposure, have proved to be so patchy that the development values on the lowest levels are, on the whole, disappointing. The capital expenditure during the year amounted to £51,119, of which £33,652 was spent on shaft sinking and stations; £10,677 on buildings, including new cottages for employees, and £7,973 on machinery and plant. The expenditure on shaft sinking will continue to be considerable during this year.

The Special Intelligence Branch of the Ministry of Munitions of War has issued a brochure on **Welfare Study.** "Welfare Study," written by Mr. Cecil Walton, manager of one of the large National Projectile Factories, from first-hand knowledge. In a preface note "V.B.S." explains how the secret of promoting union between all classes, which he had sought before the war without avail, was revealed to him on active service at the Front—it was simply the fact that "the British officer has thoroughly inculcated into him that *his first duty is the care and welfare of his men.*" This is the lesson which we must learn to apply in our industrial life. The author, by way of introduction, declares that welfare work has come to stay; "apart from all question of general or individual comfort, *it pays*"; moreover, it will be found a most fascinating study. He proceeds to explain what it is; that it does not merely mean "canteens, and chairs, and games"; it is the study of mankind, the introduction of the humanising element into manufacture. This is the keynote of the work. Welfare is essentially the business of the general manager, whose principal function is to choose correctly suitable subordinates and to provide an efficient organisation, pervading the whole organisation, so that the head can keep in touch continuously with the trend of feeling amongst the staff and workpeople of every rank. An atmosphere of mutual assistance must be created, and antagonism dispelled. The study of fatigue is the next step; the appointment of a wholly competent and sympathetic welfare superintendent is essential; an ambulance room must be provided; the question of clothing must be studied, and suitable overalls provided; comfortable, clean, and sunny canteen must be organised, and adequate facilities for recreation must be arranged for. In the greatest compass, but with convincing earnestness and sincerity, the author thus puts his successful experience at the service of employers.

### City and Suburban.

The following are details of the City and Suburban's operations for April:—Tons milled, 21,200; gold recovered, 9,658 fine ozs.; profit, £13,189.

### Glynn's Lydenburg.

The following are the particulars of this company's output for the month of April, 1917:—Tons crushed, 3,890; yielding 1,705.7 fine ozs.; estimated value of month's output, £7,093; estimated profit for the month, £2,581.

### Brakpan Mines.

The following are the particulars of the April, 1917, output of Brakpan Mines:—Stamps working, 100; running time, 28 days; ore crushed, 52,200 tons; tube mills working, 10; ore hoisted, 69,075 tons; ore from dump, nil; waste sorted, 15.19 per cent.; fine gold declared, 21,621.03 ozs.; value declared, £92,136, equal to 35s. 3.61d. per ton milled; working costs, £53,621, equal to 21s. 6.53d. per ton milled; working profit, £38,515, equal to 11s. 9.08d. per ton milled.

While boring for water on behalf of the Municipality at West Hill, Grahamstown (writes a correspondent), which is within the city area, the workmen, at a depth of 120 feet, struck a hard substance which, upon examination, was found to have the appearance of coal. Portions put into a fire proved to be readily combustible, and samples have been submitted to Professor Schwartz, Geologist at the Rhodes College, and Dr. Purvis.

### Voluntary Liquidations.

The Bloemhof and District Water and Power Supply Co., Ltd., Johannesburg; capital, £760.  
Formosa Gold Mining and Prospecting Co., Ltd., Johannesburg; capital, £25,000.

## SOME ASPECTS OF THE TRANSVAAL COAL TRADE.

[FROM A CORRESPONDENT.]

THE opinion seems to be generally held that the future of the coal trade of South Africa is more promising than was apparent at any past period of its history. This may be true of the Transvaal and Natal coalfields, but owing to the inferior quality of the coal little improvement can be looked for in the future of the Cape and Orange Free State coalfields. Statistics show that during the first quarter of this year, the Transvaal collieries produced 1,511,060 tons, as compared with 1,401,591 tons for the corresponding period of last year; whilst the average selling price improved from 1s. 4d. to 4s. 9d. per ton. This cannot be regarded as an abnormal increase in the output of coal, for if we examine the Transvaal statistics for the last quarter of a century, we shall find that the Transvaal output of coal has practically always shown a ten per cent. increase year by year. Whether the improvement in the selling price of fivepence per ton as compared with a year ago is a satisfactory increase under the circumstances is open to doubt, and in some quarters there is a disposition to blame the Coalowners' Association for the prevailing low average selling price of coal. This opinion seems to be largely held by those connected with the collieries outside the Transvaal Coalowners' Association, but if the truth be known the non-associated collieries are probably more to blame for the prevailing low average selling price of coal than those connected with the Transvaal Coalowners' Association. It will probably be remembered that last June the Transvaal Coalowners' Association attempted to obtain much better prices from the Railway on the occasion of the renewal of the locomotive contracts, but those attempts were rendered only partially successful by the manner in which the South African Railways played off the non-associated collieries against those in the Transvaal Coalowners' Association. Practically all the non-associated collieries lent themselves readily to the scheme, and seeing that the South African Railways consume about two million tons of coal per year, of which about a million and a half tons are supplied by the Transvaal collieries, the value of the railway contract to the Association is considerable. It was recognised at the time that the non-associated collieries in the Transvaal, even if they contracted to sell the whole of their output to the Railway, could not supply more than one-half of the Railway requirements, and it was due to this fact that the Railway was eventually compelled to come to some arrangement with the Transvaal Coalowners' Association, and pay a higher price for the new contracts. With the exception of the railways in India, China and Japan, the South African Railways are paying less for their loco coal than any other railway in the world, and when it is remembered that several of the non-associated collieries even to-day are supplying the Railway with the bulk of their output at less than 1s. per ton—even as low as 3s. 7d.—the non-associated collieries have no justification in attempting to place the responsibility for the present low average selling price of coal at the door of the Transvaal Coalowners' Association. As it is the Transvaal Coalowners' Association by insisting upon a higher price, lost a good slice of the Railway locomotive contract. It is the policy of the Railway, of course, equally with other large coal consumers, to nurse the non-associated collieries as much as possible, so as to be able to use them as pawns against any aggressive action of the Transvaal Coalowners' Association. It will, however, take many years before the non-associated collieries can produce such an output as will overtake the heavy coal consumption of the Railway. Both the South African Railways and the Government have for some time past been quietly acquiring coal properties, so that in the event of it becoming absolutely necessary they can be opened up, so as to supply the Government Railways with coal. No objection whatever can be taken to this step, because in most parts of the world, railways whether privately owned or Government owned, frequently run collieries to supply them with locomotive coal. Providing the collieries are run on the same business

lines as private concerns, which is not always the case, the cost of the coal to the railway from their own collieries is not always in excess of that obtainable from privately owned collieries by contract. In the majority of cases, however, State owned railways and collieries are not always run on strict business lines, but considering the manner in which the Government Railways in South Africa are run—so comparatively free from political taint—there seems no reason why railway owned collieries cannot be run in an equally satisfactory manner. We have, however, a bad precedent in South Africa with regard to railway owned collieries. A quarter of a century ago the Springs Colliery was run by the Netherlands Railway, and in its early days was not run badly when it supplied the gold mines with coal as well as the Netherlands Railway. The amount of capital wasted on its equipment on continental lines was, however, enormous, its administration later left much to be desired, the coal costing the railway more to work than a better class of fuel could be bought in the open market; and it was a great relief to the railway administration, when owing to faulty exploitation the underground workings took fire, and the working of the colliery had perforce to be abandoned, thus enabling the Netherlands Railway to purchase a better class of fuel much cheaper in the open market. When we come to consider the position of affairs in connection with the bunkering and export trade, we find that the Transvaal Coalowners' Association have things more their own way, as with their control of a much larger free output of coal than the non-associated collieries, they are in a better position to meet the large and sudden demands, so often made in connection with this branch of the Transvaal coal trade. A year ago the non-associated collieries used to come to each other's assistance when a sudden demand sprang up for bunker or export coal, but now that they are so tied up with the Railway that condition has ceased to exist. In these circumstances it appears somewhat strange that the Transvaal Coalowners' Association have not materially advanced the prices for bunker and export trade, seeing that the Railway have advanced the railway rate for bunker coal to the extent of 6s. per ton, and the Natal Coalowners have so considerably put up the price without apparently affecting the demand for bunker coal. Statistics show that the coal shipped at Lourenço Marques increased from half a million tons in 1915, to three-quarters of a million tons last year, whilst at Durban and Capetown together during the same period, the shipments increased from 1,200,000 tons to 2,100,000 tons. So far this year the demand seems to have continued on the up grade, and with Transvaal coal at such a low figure when compared with Natal coal, its only competitor, it is difficult to understand why the associated collieries of the Transvaal have not taken greater advantage of the position. In other coalfields of the world, the mere fact that the cost of most of the leading items of stores have doubled in price during the war, would have caused a substantial increase in the selling price of coal all round, and no matter from what aspect regarded there is some justification for the view that from a shareholder's standpoint, the selling prices of coal in the Transvaal are at present far too low. On the other hand, it must not be overlooked that many large consumers of coal in the Transvaal hold controlling interests in the collieries, but even that is no reason why outside these interests especially, a higher price for coal under existing circumstances should not be demanded. In the future of the Transvaal coal trade there is one dark cloud looming, and that is the probable even greater scarcity of railway rolling stock for dealing with the output than is the case to-day. The coal output is constantly increasing, and to-day there is a chronic scarcity of empty trucks, and who can predict what the condition of affairs may be before the end of the European war? In 1914 when the war broke out the total coal output of the Transvaal was 5,157,268 tons, whilst last year it increased to 6,136,913 tons, and so far for this year a similar rate of



merchandise has been maintained. Such an increase of output naturally requires a corresponding increase in the railway rolling stock, if work at the collieries is to go on smoothly, especially when the bulk of that increased output has to be conveyed over long distance to the coast. It is well that to do the work properly the Railways require an additional five thousand trucks, whilst the condition with regard to locomotives is equally unsatisfactory. There appears no prospect of such an increase of rolling stock being available, but there is also the question of wear and tear to be taken into consideration, which adds still more to the helplessness of the situation. This growing scarcity of railway rolling stock is the principal cloud overshadowing the future of the Transvaal coal trade, and how to minimise its effects is not an easy task. Ever since the unification of the South African Railways, the scarcity of rolling stock has gone from bad to worse, until in the immediate future owing to the war, the position promises to become intolerable. The tendency is to blame the Railway Administration for always keeping the rolling stock below the actual requirements for the sake of economy, and this blame seems to overshadow what credit may be due to the Administration for having during war times and with a constantly growing output of coal, kept the collieries working as well as they have worked during these trying times. The question might be asked

whether in face of the apparent helpless condition of the Railway Administration, the collieries cannot do more to alleviate the position, until additional rolling stock becomes available. Seeing that a good deal of the trouble is likely to be caused by the growing shipments of coal, undoubtedly the Transvaal collieries can render more assistance than in the past. Those with experience of the shipping coal trade know how irregular is the demand, and how necessary it is at the collieries as well as at the coast, to have suitable arrangements to combat this irregularity, even if it necessitates the provision of accommodation for the stocking of, say, 20,000 tons. At the Transvaal collieries these arrangements are conspicuously absent, and if there is a temporary shortage of empties the collieries have to play, and hence we hear that such and such a colliery has had to play so many days during the month, for want of empty trucks. At other times it is noticeable that the supply of trucks appears greater than the demand. It is not absolutely necessary to go to the expense of constructing coal bins for this purpose of storing coal, as any one with a practical knowledge of the shipping coal trade knows; and if only the collieries would organise such an arrangement at the collieries, less trucks would be used for storing coal at the coast, and the need for laying the collieries idle during a temporary shortage of trucks would not exist.

## COAL IN ANGOLA: SOME OF ITS PRODUCTS.

Dr. Marloth, consulting chemist, of Capetown, has been making some interesting tests in his laboratory on some specimens of highly bituminous coal brought round from Angola by Mr. McKinnon. This coal, Mr. McKinnon states, is to be found in huge quantities ("millions of tons," he says) at Quilungo, a place which is only 90 miles from the Port of Loando, and about seven miles from Zenze railway station, from which point it is to be connected by rail in the near future. The coal is very easy to mine, being accessible by means of adits to the mountain, of which Mr. McKinnon shows interesting photographs. The coal, which is now being worked to supply a Government contract, is taken out by boys, who clean it by hand, and carry it in 50 kilo loads to the railway station. The contract coal is used for fuel; but the coal in its raw state is said to be too bituminous to make good fuel. It has much more valuable products, which Dr. Marloth has been extracting from it by means of a small still.

Dr. Marloth finds that the coal, after having been in the still, resolves into 31 per cent. crude oil, 56 per cent. coke. He has submitted the oil to various refining processes, with the result that he now shows samples of it in the form of good benzine, suited for cleaning delicate materials, petrol for fuel for motor engines, paraffin suitable for illumination or for fuel, lubricating oil suitable for delicate machinery, and a thicker lubricating oil suitable to be used on engines worked by steam, and, lastly, vaseline. So that, from the raw coal, 60 per cent. very valuable commercial products result.

Mr. McKinnon has the greatest expectations of the future of these coal mines, and a company for their exploitation has, he said, been already formed and the capital fully subscribed. Dr. Marloth's investigations go to support his expectations.

Dr. Marloth, in fact, in his report, goes so far as to conjecture that the discovery of the Quilungo coalfields will have a great effect not only upon the development of Angola, which has up till now depended on imported fuel of all kinds, but upon the whole of South Africa, for he says, "nothing like it is known from any other part of the sub-continent." The use of the coal as fuel, however, he regards as "inertional and wasteful," since both solid and liquid fuels can be extracted from it, leaving the valuable by-products in the shape of lubricating oils, paraffin, etc., which could usefully serve South Africa. Owing to its richness in volatile hydrocarbons of high illuminating power the

Quilungo coal will also prove of great value to gasworks, where it will serve as a substitute for the expensive cannel coal, which is now added to some extent to ordinary gas-coal in order to enrich the gas. Its chief value, however, he considers to lie in its large yield of oil. Comparing these with the Scottish Midlothian oil industry and with the shales of Autun in France, Dr. Marloth finds the yield of the Quilungo far richer. For example, the yield of the Scottish shale is 30 gallons raw oil per ton of rock, leaving a coke with 9 per cent. of carbon. The Quilungo material yield 70-75 gallons of raw oil and a coke of over 50 per cent. carbon, which is suitable for railways, factories, agricultural and domestic purposes.

### SHALE AND SANDSTONE.

Dr. Marloth has also reported upon the bituminous sandstone which forms the roof of the mine, and on the bituminous shale of its floor, between which runs a 6 feet seam of the rich coal already described, apparently with other seams above and below. The bituminous sandstone, says Dr. Marloth, would be useful in the manufacture of asphalt mastic for the paving of streets similar to that laid down in Long Street, Capetown, for which mastic was imported from Switzerland. The Quilungo asphalt should obviate the necessity of importing it. Any of the material not used for the making of asphalt could be subjected to dry distillation for the manufacture of oil in the same way as could the shale which forms the floor, which produces 14 per cent. of raw oil, mostly composed of the heavier paraffins. The spent rock still contains 6 to 7 per cent. carbon, which is too small to make it valuable as fuel. The manufacture of oil from shale would present no difficulty. It is so similar to the shale used in the Scottish oil industry that machinery of the same pattern would be suitable. On the whole, the Quilungo coalfields seem to promise to be a fruitful aid to the economic development of South Africa generally.—*Cape Argus*.

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## ENGINEERING STUDENTS IN UNION GOVERNMENT EMPLOY.

THE following return has been submitted to the Senate with regard to the engineering students from the South African College and the South African School of Mines, employed by Government, etc.: (a) Engineering students who left with engineers' diplomas from the South African College (C) and the South African School of Mines (S) since 1912:—1912: (C), 5; (S), 7. 1913: (C), 8; (S), 27. 1914: (C), 1; (S), 23. 1915: (C), 5; (S), 18. 1916: (C), 9; (S), 4. (b) The number employed in Government service, the positions they occupy, and the salaries they receive: S.A. Railways: (C), 11; (S), 2. Employed as pupils at salaries ranging from £159 to £195 per annum. Public Works: (C), 1. Indentured for three years at 7s. 6d. per diem to 12s. 6d. per diem. Irrigation: (C), 1. Three as assistant engineers, at salaries ranging from £200 to £300; one indentured for three years at 7s. 6d. to 12s. 6d. per diem. Posts and Telegraphs: (C), 4. As plant assistants; three at £260, one at £150 per annum. Mines Department: (C), 5. As Assistant Inspectors of Mines, at £450 to £550 per annum. (N.B.—Engineers from the School of Mines usually obtain employment on the mines.) (c) The conditions as to salary and promotion on which these young engineers are employed by the Government: In the three first-named departments engineering students are generally indentured for a period of three years at a remuneration of: 7s. 6d. per working day for the first year, 10s. per working day for the second year, and 12s. 6d. per working day for the third year—further promotion being dependent upon the efficiency displayed and the amount of work offering. Promotion in the

other two departments is subject to the occurrence of vacancies: (d) The number of engineers with diplomas from overseas employed by the Union Government from 1912 to 1916 and the conditions: S.A. Railways (5): Two as District Engineers, one as first Assistant Engineer, one as second Assistant Engineer, and one as Junior Engineer. These engineers are employed under temporary conditions only, and their services are liable to be terminated on completion of the work upon which they are engaged, unless further work is then available. Of the two District Engineers, one was South African born and the other had had previous service on the Cape Railways. Public Works (1): In a temporary capacity at £25 per mensem. Irrigation (3): One Professional Assistant at £1,000, one Circle Engineer and one Assistant Engineer at £600 per annum each. Mines Department (9): As Assistant Inspectors of Mines and Machinery at £100 to £500 per annum. Posts and Telegraphs (2): One on scale £100 to £500; one on scale £180 to £260. In all cases promotion is subject to the occurrence of vacancies. The amount of the subsidy granted to the Engineers Departments of both the South African College and the South African School of Mines in 1916 was as follows: South African College, approximately, £1,800; South African School of Mines, approximately, £5,000. The number of students to the South African College and the South African School of Mines, who carry on their studies in mining, civil, electric, mechanical engineering, and in technology in 1916 was: South African College, 71; South African School of Mines, 56.

## COMPARISON OF STAMP MILLING COSTS BETWEEN CALIFORNIAN AND NISSEN STAMPS AT MODDER B.

Mr. K. L. Graham writes to the Journal of the Chemical, Metallurgical and Mining Society as follows:—"Referring to Mr. H. A. White's remarks, published in the February Journal, page 128, on the above subject, he appears to have overlooked the footnote in regard to the respective ages of the plants during the periods over which the figures I submitted were obtained. This note clearly states that the respective ages of the plants were approximately equal. In other respects the comparison rather favours the Californian stamps, as the cost of stores and materials had increased considerably in 1915. After Mr. White's candid acknowledgments regarding the economic advantages of the Nissen stamps, it would be labouring the matter to do more than to point out that the figure 8-118d. refers to the average cost of stamp milling at Modder B. for the whole year 1913, whereas the figure 8-754d. happens to be recorded for one month only, namely, November, 1911—that particular month incidentally coinciding with the introduction of the new units. Mr. White evidently wishes it to be inferred from the figures quoted that the Nissen stamps proved more expensive to operate than the Californian. In this he is particularly unfortunate, in view of the fact that the average milling cost over the three months preceding the starting of the Nissens was 9-3d. per ton on a tonnage basis of 39,300. From this figure—without admitting the correctness of such an assumption—the opposite would appear to be the case. The opportunity to make a comparison of this kind, under ideal conditions, rarely occurs on our mines, experimental work invariably having to be subordinated to the exigencies of profit-making. However, something approaching the special conditions enumerated by Mr. White obtained at the City Deep, Nissen *versus* Californian stamp trials, details of which appeared in this Society's Journal in October, 1911, from which it will be seen that in trials 3 and 6, crushing the same ore through 3 in. mesh, amongst other advantages, the screen grading of the pulp showed slightly in favour of the Nissen stamps." The figures referred to by Mr. Graham are as follows:—

### Comparison of Stamp Milling Costs between Californian and Nissen Stamps at Modder B.

Californian costs cover the period January to December, 1913. Nissen costs cover the period September, 1915, to August, 1917. Average cost in pence per ton:—

	Californian, d.	Nissen, d.
White wages .....	1-773	0-945
Coloured wages .....	0-402	0-464
Coloured labour sundries ..	0-281	0-292
Mill spares .....	0-922	1-206
Shoes and ties .....	0-909	0-309
Water .....	0-053	0-239
Sundry stores .....	0-431	0-272
Workshops .....	0-187	2-033
Power .....	2-857	
Total .....	8-118	5-850
Difference .....		2-268

Tons milled .....

104,589 137,611

Note:—Comparison made over a period when the respective ages of the plants were approximately equal.

K. L. GRAHAM.

24th October, 1916.

### MINING EXAMINATIONS.

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## S.W. TRANSVAAL DIAMOND OUTPUT.

### Splendid Total for April.

The returns for April from the alluvial diamond diggings of the South-Western Transvaal have exceeded the most optimistic expectations, and the newly discovered field of Itale is the cause. This town was opened to the public about six weeks ago, when at least 1,500 peggers were present, and today there are 1,250 licences in existence on the town. The output averages, therefore, nearly £200 for each licence. The returns of the original prospector for the previous 4 months were: December, £2,906; January, £1,250; February, £1,177; and March, £981; and from the month of May to November, 1916, the finds increased from £50 in May to £205 in November. It is a curious fact that the best ground was pegged by men who, by reason of age, infirmity or lack of conveyance, were last in the race. The rush was made towards the discoverer's ground, and the fleetest raced the furthest, but those who were not so swift had to be content with ground farther away, and it has been proved that the ground at the starting line is as rich as any and richer than most of that pegged.

#### THE PRODUCING AREAS.

The returns for the four months of this year have been as under:

	Carats.	Value.
January .....	3,149½	£22,047 13 0
February .....	3,679½	21,911 5 0
March .....	1,135	26,983 3 6
April .....	6,036	40,731 7 0

To get any month's output equal to April, it is necessary to hark back to the first half-year of 1913 when the finds ranged from £10,381 to £58,172 per month. Forty-two areas figured in the returns last month, and these were as follows (those in Bloemhof district being given without mark; \* denoting Welmaransstad district, and † Potchefstroom district):—

	Carats	Value.
Itale .....	3,078½	£22,379 10 0
Kameelkuil .....	700½	4,508 12 6
London .....	622½	3,795 12 6
Bloemhof .....	321½	2,031 12 6
Schweizer-Ren-ke .....	232	1,467 4 0
Plessisdam .....	148½	754 10 0

#### Postage from Rhodesia.

The  *Bulawayo Chronicle*  states that the War Postage Ordinance, which was passed during the recent session of the Legislative Council, came into force on May 16. Postage on letters for delivery in Southern Rhodesia, Northern Rhodesia, the Union of South Africa, the South-West African Protectorate, Nyasaland and Mozambique is now 1½d. per half ounce, and on letters to the United Kingdom and other parts of the Empire 2d. per half ounce. The Ordinance will expire on June 30, 1918, "or on the day completing six months after the declaration of peace in the present war, whichever date shall be the later, unless re-enacted for a further period." Letters addressed to any member of His Majesty's Naval or Military Forces on active service are exempt from the additional charge, and will continue to be charged one penny per half ounce.

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	Carats	Value
*Lecwfontein .....	107½	745 0 0
*Sijfergat .....	121½	703 5 0
Christiana .....	87½	655 5 0
Mimosa .....	99½	597 10 0
Goedehoop .....	40	367 0 0
Beschfontein .....	6½	331 15 0
Koppiesvlei .....	56½	315 16 0
*Doornbult .....	15	297 10 0
Mooifontein .....	5½	201 10 0
Grootdoorns .....	19½	193 10 0
Zevenfontein .....	35½	193 7 6
Panfontein .....	11½	181 7 6
*Karepan 137 .....	22½	150 5 0
Cawood's Hope .....	23½	126 4 6
Diamantdoorns .....	19½	124 10 0
Rietput .....	19½	108 5 0
Kromellenboog .....	11½	102 15 0
*Schiepan .....	11	98 0 0
*Holloway's Rust .....	21	96 10 0
Dievedraai .....	14	69 0 0
*Katboschfontein .....	6½	30 15 0
Jala Jala .....	3½	15 0 0
Grootpoort .....	2½	13 0 0
*Klippan .....	3½	12 0 0
Rietkuil .....	4½	10 10 0
Eerstebegin .....	1½	7 10 0
Zoutpan .....	1½	7 0 0
Krompan .....	1	7 0 0
*Boschplaats .....	14	4 7 6
*Katdoornkraal .....	1	4 0 0
Witgatboom .....	1	4 0 0
†Potchefstroom Town Lands .....	1½	2 12 6
Karepan 164 .....	2½	2 0 0
Schaapboschdraai .....	1½	1 10 0
Houtvelop .....	1	1 5 0
*Eastleigh .....	1	6 10 0

#### SOME OF THE FINDS.

Among the more important finds are a parcel of six stones, aggregating 85½ carats, value £367, and 23 others, aggregating 333 carats, value £1,657, from Itale; Kameelkuil records one of 11½ carats, value £25, and another of 27½ carats, value £236; London produced two aggregating 42½ carats, value £23 7s. 6d., and four aggregating 36½ carats, value £671; at Bloemhof, one of 12 carats was sold for £64, and two aggregating 17 carats for £263; at Sijfergat, one of 23½ carats, value £116 5s., was found; at Christiana, one of 23½ carats, value £197; Mimosa produced one of 10½ carats, value £75; Goedehoop, one of 8 carats, value £117; Doornbult, one of 12 carats, value £75.

#### New Kleinfontein.

Appended are details of the operations on the property of this company for the month of April:—Stamps, 250; days, 28-229; tube mills, 8; tons milled, 79,719; gold recovered, 21,029-021 fine ozs.; net value, £87,270 8s. 9d.; profit, £20,096 4s. 8d.; working costs (excluding development), 17s. 3d.; development to working costs, 1s. 9d.; total working costs 19s.; capital expenditure, £1,983 17s. 5d.

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## INDUSTRIAL CENSUS: DETAILED REGULATIONS.

It is notified for general information that His Excellency the Governor-General-in-Council has been pleased to approve, in terms of Section 10 of the Statistics Act, No. 38 of 1914, of the following regulations relating to a Census of Productive Industries in the Union:—

1. For the purposes of these regulations a factory shall be deemed to be and include every manufacturing or other establishment in the Union.

- (1) (a) employing four or more hands, including the proprietor or manager or other person in charge thereof; or
- (b) employing any form of motive power excluding manual labour; and
- (2) engaged upon any work of production or upon any other industrial process excluding mining and quarrying, but including any industry relating to:
  - (a) the treatment of raw material, the product of agricultural and pastoral pursuits;
  - (b) the extraction or treatment of oils and fat, whether animal, vegetable or mineral;
  - (c) processes in stone, clay, glass or such like material;
  - (d) working in wood;
  - (e) metal, engineering, machinery and cutlery works;
  - (f) the preparation, treatment or preserving of foods, drinks and condiments;
  - (g) the production of clothing, textile fabrics and similar articles;
  - (h) books, paper, printing and engraving;
  - (i) arms and explosives;
  - (k) vehicles (mechanically propelled or otherwise), fittings for and parts of vehicles, saddlery and harness;
  - (l) ship and boat building;
  - (m) furniture, bedding and upholstery;
  - (n) drugs, chemicals (including fertilizers and by-products);
  - (p) surgical, dental and other scientific instruments;
  - (q) jewellery, timepieces and plated ware;
  - (r) heat, light and power;
  - (s) leatherware;
  - (t) housebuilding; and
  - (u) any other matter not enumerated.

2. The person in charge of any factory shall on or before the 30th day of June, 1917, render on a form which he shall obtain from the supervising officer of the district in which

such factory is situated, as specified in Regulation No. 5 hereof, or from the Director of Census and Statistics, Pretoria, a return furnishing all the particulars and information prescribed in Regulation No. 1 hereof in respect to such factory for the calendar year 1915 or the business year ending not earlier than 1st July, 1915, and not later than 30th June, 1916. Such return shall be delivered to the Supervising Officer, or, if desired, to the Director of Census and Statistics, Pretoria, on or before the said 30th day of June, 1917.

3. Any person in charge of any factory who, without reasonable cause, makes default in complying with these regulations, shall be guilty of an offence and liable on conviction to a fine not exceeding £25, or, in the case of a continuing default, to a fine not exceeding £1 for every day during which the default continues.

4. The following shall be the matters prescribed in the return required under these regulations:—

- (1) Description of establishment.
- (2) Year to which return refers.
- (3) Capital.
- (4) Average number of persons employed during year classified according to race, sex and age.
- (5) Amount of salaries and wages paid to the various classes of employees during year.
- (6) Cost of fuel and light used during year.
- (7) Motive power employed.
- (8) Classification, quantity and value of materials used and articles produced and value of repair and other work done during year.

5. The following persons shall be supervisors in the various magisterial districts of the Union:—

Capetown, Wynberg and Simonstown: The Supervisor of the Industrial Census, care the Labour Registration Officer, 59 Parliament Street, Capetown.

Johannesburg: The Supervisor of the Industrial Census, care Inspector of White Labour, New Law Courts, Johannesburg.

Boksburg: The Supervisor of the Industrial Census, care Mining Commissioner, Boksburg.

Pretoria: The Supervisor of the Industrial Census, Census Office, Pretoria.

Durban: The Supervisor of the Industrial Census, care Assistant Inspector of White Labour, Old Court House, Durban.

In all other districts: The Supervisor of the Industrial Census, care the Resident Magistrate.

### The Lonely.

The particulars of the above mine for the month of April are as follows:—Mill ran 689 hours; crushed 5,230 tons; fine gold recovered, 1,193·785 ozs., value £5,018 9s. 1d.; slimes treated, 5,230 tons; fine gold recovered, 3,572·390 ozs., value £15,019 11s. 2d.; total recovery of fine gold, 4,766·175 ozs.; total value, £20,038 0s. 3d.; profit, £10,216 2s. 6d.

The engine power of the Rhodesian Railways has recently been augmented by the delivery of six new heavy superheater engines. Four of these have already been put in service, and the erection of the other two will be completed very shortly. On account of the prevailing conditions in England, where all the big establishments are on war work and under Government control, these engines were ordered in America and built by the American Locomotive Company of New York. Orders were also placed by the Rhodesia Railways, early in last year, with the North British Locomotive Company, Glasgow, for six new 9th class engines, but owing to pressure of Government work the building of these engines has been delayed. It is, however, expected that two of these will be shipped shortly.

### Swaziland Tin.

The following are the results of the operations of this company for the month of March, 1917:—Concentrate recovered, 36 long tons; estimated profit (taking tin at £197 per ton), £2,126; add adjustments in respect of previous shipments, £56; total estimated profit, £2,182.

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## WORKING CONDITIONS ON TRANSVAAL MINES.

### HOURS OF WORK, ETC., ON TRANSVAAL MINES.

It is generally admitted that the single shift system is a step in the right direction. At some mines which are not yet in a position to adopt this system every effort is being made to get on to this basis as soon as possible. There is no need to lay further stress on the great importance of this

the main step to economic mining. It is well known that only a proportion of actual time underground is spent on productive work, and it is the object of this report to recommend ways of increasing this proportion. The time lost varies with the class of work performed, but is greatest in the case of machine stoping. The subject will be considered under the following heads: (a) Transport of men and material; (b) Machine stoping; (c) Hand stoping; (d) Trimming and shovelling; (e) Hoisting of rock; (f) General.

#### TRANSPORT OF MEN AND MATERIAL.

There is no doubt that the governing factor with regard to facility and rapidity with which men and material can be handled depends largely on existing conditions on each mine. It will, however, be found in many instances that, with an inappreciable outlay, modifications of existing plant might be made which would save a considerable amount of time and energy, for instance: The installation of large cages to carry from 60 to 80 men. The use of trolleys specially constructed for the easy and rapid transport of large quantities of timber, rails and other material, with suitable arrangements for the speedy handling of same. The installation of underground drill sharpening and other shops to obviate unnecessary handling; efficient arrangements for dealing with all steel underground. (It is recommended that special trolleys be used for each working level, and that a proper system of checking steel, both inwards and outgoing, be introduced.) The provision of facilities for cleaning out pump sumps. The methodical organisation of hoisting time and the prevention of individuals from taking liberties which infringe the recognised time-table.

#### MACHINE STOPING.

Machine stopers—both white and coloured—spend little more than half their time underground in actual drilling. Several suggestions have been made to increase the drilling time. One is, that a blasting shift should be introduced, to enable a machine stoper to drill up to the end of his shift, at the expiration of which pulling down and blasting will be undertaken by another man. Theoretically, there seems to be some value in this suggestion, but it has not proved a success in the past where tried. Another suggestion is that, where two shifts are worked, the practice at present found successful on some mines of running two drilling shifts consecutively with a single blasting shift at the end of the second drilling shift should be adopted. A third suggestion is that an extra incentive, to take the form of a bonus on footage drilled or fathoms broken, be given to machine boys. If native machine stopers could be induced to remain at their respective mines for longer periods, so as to enable them to understand such systems and the benefit they would derive therefrom, the standard of efficiency of machine stoping would be raised.

#### HAND STOPING.

The custom of allowing hammer boys to leave work and return to the compound after completion of their task is probably a greater incentive to work than the money paid. Two important points to bear in mind whilst considering this question are the vast difference in the drilling ability of boys, which varies from 30 inches to 72 inches, and, owing to this variation, the difficulty of carrying benches in a stope to suit all the boys in a gang. To overcome this difficulty the gangs might be made up of boys of similar ability, classified as follows: Learners; boys able to drill 30 inches; boys able to drill 36 inches; boys able to drill 42 inches; boys able to drill two holes. It is felt that the system of allowing boys to leave the mine before having done eight hours' work is wrong, but it is a custom on the Rand, and one which will be very difficult to alter. Some device may be found whereby

it will be possible for a hammer boy to drill more than he does to-day without the expenditure of greater energy, and this will necessitate the breaking down of the custom referred to.

#### TRIMMING AND SHOVELLING.

It is considered that the efficiency of trimming and shovelling on these fields is low, owing to the type of boy employed on this class of work and to the day's pay system in vogue. Trimming and shovelling boys should be given as much incentive to work as boys of any other class, and wherever possible it is recommended that they be put on piece-work. The type of truck has a great deal to do with the trimming efficiency, and the use of trucks of larger capacity, fitted with a more modern type of wheel, is suggested. To assist efficient trimming, attention should be paid to rock chutes, tips, ore-bins and the shape of stopes. In addition, carefully graded tracks, straightened out wherever possible, with check rails on all sharp curves, are recommended.

#### HOISTING OF ROCK.

The largest size of skip, compatible with the power of the engine, is advocated. Ore-bins of ample capacity, suited to the requirements of the level or levels of both vertical and incline shafts, are recommended, in order that, as far as possible, skipmen may be prevented from making unnecessary trips with empty skips. Shaft rails should be sufficiently heavy to allow of a maximum speed being attained during each trip.

#### GENERAL.

The capacity of men for doing work is an important point to bear in mind when studying the question of hours of work underground. Attention should be given to the organisation of gangs on the lines of physique and tribal preferences for certain classes of work, such as, for instance, the preference shown by the Xosa for shovelling. Further, some form of tuition might be given to new gangs which are made up along these lines, and in this case task work or contract work would more likely prove successful. The time taken by a native to get to work should receive consideration; the descent down thousands of feet with a load of drills on his shoulder necessitates the expenditure of much energy, and it is unlikely that under these conditions the labourer arrives fresh at his working place. Supervision to ensure that every native gets his breakfast before leaving the compound, and that he shall have a "break" in the middle of the shift, with possibly the issue of a light meal, are factors worthy of consideration with a view to increasing efficiency. Every European underground is a supervisor, and a strict sense of loyalty and justice must be encouraged. In order to inculcate these essentially human factors, rigid discipline—the greatest factor in saving time—must exist. Every individual must be made to feel his responsibility and should have no opportunity of shirking or shifting it elsewhere by a system which permits of his receiving orders from more than one person. Discipline in a mine will thus be more than a catchword and hours of work made productive, so far as the capacity of the worker allows. Finally, it is recommended that in all branches of underground work natives should be given an opportunity for contracting as well as Europeans. It is considered that some such system of payment is the greatest incentive to work, and the importance of this point has hardly been sufficiently realised in the past.—Appendices to Reports on Time and Labour-saving on the Mines.—Association of Mine Managers of the Transvaal, August, 1915.

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## TUNGSTEN IN RHODESIA.

### Geological Survey Report on the Essexvale Deposits.

WE publish below a Geological Survey report on the tungsten deposits of Essexvale, Umzingwane district, which has been prepared by Mr. A. E. V. Zealley (the Geologist). There seems to be general opinion that the tungsten deposits at Essexvale consist only of so-called alluvial or rubble wolframite, and that reefs have not been found. This is not true. Some reefs have long been known, and the excavation of the rubble has led to the uncovering of others, which, so far as can be judged without actual sampling and development, offer good prospects for mining. But hitherto there has been a strange reluctance to undertake mining operations on the reefs, whilst the work on the rubble has been largely desultory.

#### POSITION.

The known tungsten reefs lie within an east and west rectangular block of country of about nine and a half square miles area lying immediately to the north of Essexvale Siding and mainly to the west of the railway. The reefs extend from the neighbourhood of "The Ranche" (2½ miles north-west of the Siding) to the Native Church (1½ miles north-east of the Siding). Sixteen distinct reefs are known, eleven of which have had a little work done on them from time to time.

#### HISTORY.

The deposits were first prospected in 1906. In the ensuing two years a fair amount of ore was produced, but in 1909 the production ceased. A little interest was again taken in the deposits in 1912-13, but there was no production in 1914-15. At the end of that period a local syndicate extensively sampled some thousands of tons of rubble and made trial crushings. The grade was found to be just too low for profitable working by the methods then employed. During 1916, however, determined efforts have been made by other workers to test the rubble of two restricted areas. Altogether about 85 tons of concentrate valued at £7,165 has been marketed. The returns for 1916 are 2½ tons, valued at £467. This was produced by one worker with a few natives in a five-foot rotary diamond washer, and by one man on another claim who hand-picked rubble and recovered 1,600 lbs. of wolframite. The prospecting done on the few reefs that have been opened has nowhere been for more than a few feet below the surface. This may be due chiefly to the fact that the deposit upon which serious prospecting work has been undertaken is from its nature the least likely to prove profitable.

#### GEOLOGY.

The known tungsten-bearing tract of country occupies the central portion of an irregularly oval mass of granite about 8 miles long and 5 miles across at the widest part. The long axis of the mass trends north-west to south-east. This granite body forms the floor of a wide depression which is traversed by two permanently flowing streams, one of which is known as Fernspruit. The granite appears to pass beneath the surrounding rim of epidiorite and felsite hills. The soil is a pale red sandy loam. There are very few exposures excepting in the streams and an occasional small but bold granite kopje. The granite almost wherever seen is coarse textured and massive, that is, not schistose. It is a hornblende granite, and is thus different from the large granite masses of Rhodesia. Patches of epidiorite, probably inclusions of country rock, and dykes or other bodies of felsite are occasionally encountered, particularly near the eastern edge.

#### THE REEFS.

The tungsten reefs consist of greisen composed chiefly of a soft greenish-yellow mica or of mica, fluor spar, topaz and secondary felspar. This rock weathers soft and rusty brown. The greisen has arisen by the action of vapours on a porphyry or aplite (fine-textured white granite free from hornblende and mica). With the greisen of each reef is a variable

amount of rather white glassy quartz forming strings or large lenses in the greisen, and evidently connected with the greisenization, that is, deposited at the same time and by the same agency as the mica, fluor spar, topaz, tourmaline, chlorite, wolframite and scheelite of the greisen. The constant presence of the quartz lenses as part of the greisen bodies is a great help in recognising the presence of the greisen. Those parts of the greisen which contain little or no quartz very rarely crop out, and thus may easily escape discovery. No tungsten reefs have been found without the quartz, although it is quite conceivable that such exist. The quartz strings expand into lenses exceeding 20 feet in width, and thus make low hillocks such as those at "The Ranche" homestead; again two-thirds of a mile to the south-east of this, and at the Native Church a mile and a half north-east of Essexvale Siding. The reefs vary from 200 yards to about a mile long. The two most promising reefs exposed are respectively about a mile long and half a mile long so far as proved. These are the Rhoda reef in the north-eastern portion of Plot 27, and the reef running through the Lunar and Moon blocks near the common boundary of Plots 37 and 38. With one exception the reefs examined strike east to west and dip north at angles varying between 30 degrees and 55 degrees. The reef on Plot 4 strikes north-west to south-east, and dips north-east at 55 degrees. The width of the reefs is of course variable owing to the lenses of quartz. Apart from the quartz lenses, the width averages three feet and is surprisingly constant. In each instance the country is coarse massive hornblende granite without signs of shearing or faulting between the reef and the country. It appears therefore that the aplite was injected along master joint planes caused by the contraction of the granite on consolidating, and not in fissures caused by faulting. This may have an important bearing on the persistence of the greisen bodies below the surface. In a few instances the mica greisen has a slightly schistose appearance. In a few places greisenization of the country is suspected but this is on a small scale only, and no tungsten ore has been discovered in it. With the exception of the Union Jack reef in the north-west corner of Essexvale Reserve the aplite has been completely greisenized so far as can be judged by the small amount of reef exposed. At the Union Jack the intrusion exceeds six feet in width, but about a third of it consists of white aplite apparently ungreisenized.

#### STOCKWORK DEPOSIT.

The block upon which most work has been done differs from the above blocks which may be taken to be normal. The occurrence in question is situated on Tungsten Kopje, a prominent hill of massive hornblende granite with a low ridge extending about 300 yards to the east and a longer one to the west. The fact that a large amount of float wolframite occurred immediately around the hill led to prospecting on the hill, with the result that a stockwork deposit was discovered extending along the eastern and western ridges and on the north flank of the hill. Throughout the massive hornblende granite of this zone streaks and seams of aplite containing gashes of quartz are scattered rather sparsely and quite indiscriminately. These seams run in all directions and at all angles, many are nearly flat, but some are vertical; they make small saddles in several places, but pursue irregular courses, and expand and die out quite irregularly. They average a few inches wide and in no instance exceed a foot. None are traceable for more than a few yards. The greisen always carries streaks of quartz and occurs on one or both sides of the latter. The aplite varies in degree of greisenization. In some parts the greisen consists of sugary quartz and pyrite with very fine wolframite scattered through it but invisible to the naked eye. Such a rock weathers brown and strongly resembles sandstone. It is always present in the rotary concentrate. In other parts the greisen consists chiefly of soft yellow mica. At the south-west end

of this deposit a body of greisen about six feet wide, striking north to south and dipping about 40 degrees E. has been opened and afforded rich patches of wolframite.

#### MINERALS OF THE GREISENS

The minerals detected in the greisens comprise quartz, soft yellow mica, feldspar, dark green chlorite in rosettes, black tourmaline, pyrite (altered to cubes of limonite at the surface), fluorapatite (blue, mauve, green, white and colourless), topaz (pale brown and colourless), galena (rather rarely), pyrrhotite, wolframite and scheelite. Small quantities of each of these occur in the quartz. Here and there a bunch or streak of any one of them, including the tungsten minerals, lies in the quartz. The distribution of the minerals in the quartz or in the altered aplite is in fact generally patchy as is always the case in greisens. Coarse aggregates of any one mineral are occasionally noted, for example, single aggregates of very large wolframite crystals weighing 235 and 157 lbs. are said to have been found at the stockwork deposit, and similar groups of crystals have been obtained at the Lunar Block (the specimen in the Rhodesia Museum weighing 172 lbs. coming from here). Pieces of wolframite weighing up to 8 lbs. are not uncommon, and groups of pale pinkish scheelite crystals measuring 3 or 4 inches are to be found. The two tungsten minerals are commonly intergrown; but in spite of this and of the fact that scheelite, containing as it frequently does, several per cent. more tungstic oxide than wolframite, may be worth several pounds sterling per ton more than the wolframite, it was found that the scheelite was neglected by the workers; in fact, considerable trouble was taken by them to separate it from the wolframite and reject it. Scheelite is a mineral very easily recognised, and the natives engaged in panning the concentrate should be taught to know it. Although it is not unlike quartz so far as colour is concerned—being white, pinkish or yellowish, its characteristic greasy lustre, softness (it is easily scratched by the knife or by quartz), and heaviness are properties which differentiate it sufficiently from any of the minerals with which it is associated. If boiled in dilute hydrochloric acid it becomes coated with bright yellow powder soluble in alkali. Amongst the dark minerals got in the concentrate, magnetite may be recognised (and separated) by the magnet, and limonite by being in brown cubes. Coarse and moderately fine wolframite is easily distinguished from the other black minerals by its greater specific gravity and chocolate-brown streak; it breaks into flat shabby pieces with lamellar structure owing to the presence of a single perfect cleavage; the flat surfaces are bright and shiny (submetallic to resinous lustre), whilst the cross fractures are dull. Ilmenite, which is rather abundant in very fine round grains in the concentrate of the rubble, is difficult to distinguish from fine wolframite by simple tests,

and this fact had led to the rejection of the finest concentrate.

#### MINERALIZATION

In addition to the minerals common to greisen, the presence both in the stockwork and in the veins of galena, pyrite, pyrrhotite and presumably gold, together with the large amount and constant presence of a kind of quartz which is indistinguishable from the ordinary vein quartz of gold deposits, suggests that the Essexvale tungsten deposits are not normal greisens, but to some degree assume the characters of gold quartz vein type of deposit. In fact they appear to form a connecting link between the two types. This theory is borne out by the character of the mineralization of the country rock alongside the greisen streaks in the stockwork deposit. The rock is pyritized (pyrite and pyrrhotite), and the feldspars altered to sericitic aggregates.

#### THE RUBBLE.

The richer patches of rubble lie within 100 yards of the greisens on the steeper ground and within about 25 yards on the flat ground. Tests of this rubble indicate that the yield of wolframite (the scheelite as noted above being rejected) varies from 2 to 8 lbs. per ton. In this estimate the occasional lumps of coarse wolframite are not included, and fine wolframite and scheelite in lumps of rock and free are also not included, since they are rejected. In the instance of the western end of the Lunar Block reef it was stated that early in 1916, 1,600 lbs. of wolframite was picked up from the surface by hand without any appliances, without even a prospecting pan, notwithstanding that the ground had been broken, turned over, and picked on at least one previous occasion. Where the rubble is being more thoroughly tested, the ground made up of angular quartz fragments, brown-weathered greisen and sandstone-like aplite in a matrix of red loam, is hand-jigged on rocking screens, the coarse wolframite being hand-picked from the screens. The fines are concentrated in a 5-foot rotary diamond washer, which recovers the tungsten minerals and even the fine heavy minerals. The concentrate is then panned by hand. The coarse wolframite (pieces over  $\frac{1}{2}$  inch) are picked by hand and the fines repanned. Any coarse wolframite with adhering quartz is pested and panned. The coarse and medium concentrate so obtained is remarkably clean wolframite. The finest concentrate consists of wolframite and scheelite, with a certain amount of quartz, feldspar, epidote, hornblende, mica, zircon and tourmaline, together with a trace of gold, and a fairly large quantity of ilmenite, limonite cubes, and magnetite. The finest concentrate is rejected under existing circumstances, but on a larger scale of operations concentrating tables and magnetic separators may be expected to give profitable results.

#### Springs Mines.

The following are the particulars in regard to the April, 1917, output of Springs Mines:—Stamps working, 69; running time, 23 days; ore crushed, 27,400 tons; tube mills working, 6; ore hoisted, 24,834 tons; ore from development dump, 4,390 tons; waste sorted, 10'24 per cent.; fine gold declared, 11,647.71 ozs.; value declared, £48,995, equal to 35s. 9.15d. per ton milled; working costs, £31,341, equal to 22s. 10.52d. per ton milled; working profit, £17,654, equal to 12s. 10.63d. per ton milled. The profit was adversely affected by the further absorption of gold by the plant.

#### Transvaal Gold Mining Estates.

The following are the particulars of the T.G.M.E. Company's output for the month of April, 1917:—Central Mines: Tons crushed, 12,750; yielding 5,457.4 fine ozs. Elandsdrift Mine: Tons crushed, 1,430; yielding 1,063.2 fine ozs. Vaalhoek Mine: Tons crushed, 1,940; yielding 601.9 fine ozs. Estimated value of month's output, £29,575; estimated profit for the month, £6,771.

The Premier Diamond Company has declared dividend No. 25 of 125 per cent., equal to 6s. 3d. per share, preference shares, for the half-year ended 30th April, 1917.

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## METALLURGICAL PROBLEMS OF THE RAND.—I.

[By H. FOSTER BAIN.]\*

### INTRODUCTION.

METALLURGICAL practice on the Rand has been described with generous wealth of detail by the men responsible for its success. Indeed Rand practice has been discussed with unusual fullness and precision in two notable volumes, supplemented by numerous papers read before the technical societies; particularly a recent summary by F. L. Bosqui, which, with the succeeding discussion by C. W. Merrill, Hennen Jennings, W. A. Caldecott, A. J. Clark, G. H. Stanley, W. R. Dowling, and H. A. White, brings the whole matter up-to-date. It may not be wholly useless, however, to set down some of the questions that come up to a visitor as he makes the round of the mills under the courteous guidance of resident metallurgists. Most readers of *Mining and Scientific Press* have not visited the Rand and probably never will. To them, there may be interest in learning how the Rand mills impress a visitor who comes to them with only that general knowledge of milling that the practitioner in another branch of the mining profession can claim. Preliminary to this the briefest possible summary may be presented of standard practice. In this I shall follow the excellent and brief summary contributed by W. A. Caldecott to the recent edition of Rose's "Metallurgy of Gold." After passing through either jaw or gyratory crushers, set underground to crush at 6-9 inches and at the surface to reduce to 1½-2 inches, the ore is fed under heavy stamps and thence through screens having openings up to ½ inch. From here it gravitates or is pumped to tube mills, 5½ by 22 ft., passing through a cone, diaphragm or plain, the overflow being further split into sand and slime for the cyanide plant. The coarse material, with about 39 per cent. moisture, is crushed by means of selected hard pebbles (picked out of the conglomerate constituting the ore) passed over the amalgamating plates, and returned to the first cone from which that which is sufficiently fine overflows, and, after passing classifying cones, goes to the cyanide annex. The sand is collected wet or dewatered on a sand-table and then mixed with solution, to be treated by percolation in vats. The slime is delivered to vats, where the mill-water is decanted, then cyanide solution is added and the material circulated by being pumped from vat to vat as the requisite number of washes are given. In a large number of plants this method has been superseded by the Butters system of vacuum-filtration, too well known to require further comment here. The solution is decanted or filtered, clarified in sand-vats, and precipitated upon zinc, mainly in the form of shaving. The general results of this treatment are summarized below, the table showing averages *pro rata* to tonnage, from the records at the Simmer and Jack, Robinson Deep, Knights Deep, and Simmer Deep mines in 1913. Ore crushed monthly, in tons, 70,567; Percentage of minus 90-mesh product in the tailing leaving the crushing plant, 75.4; percentage of sand, by weight, 54.52; percentage of slime, by weight, 15.48; screen assay-value, in dwts. per short ton, 4.720; assay value before cyaniding, sand, dwts. per ton, 2.595; assay value before cyaniding, slime, dwts. per ton, 1.482; assay value before cyaniding, total, dwts. per ton, 2.089; assay value after cyaniding, sand, dwts. per ton, 0.354; assay value after cyaniding, slime, dwts. per ton, 0.171; assay value after cyaniding, total, dwts. per ton, 0.271; percentage of theoretical extraction, 94.26; percentage of theoretical extraction by amalgamation, 55.74; percentage of theoretical extraction by cyanidation, 38.52; percentage of actual recovery, on screen assay value, 95.17; total working cost per ton crushed from headgear to dump, 80c.

### SCALE OF OPERATIONS.

Probably the first impression received by the visitor is made by the great scale of operations and the extent of territory involved. From end to end of the Rand is 70 miles,

and for almost the whole distance mine crowds upon mine. It is only in the Far East, where the lode lies nearly flat, that the distance between shafts becomes impressive. Along the Central Rand there is one nearly continuous range of tailing-piles. That this impression is not incorrect is indicated by the fact that the number of tons hoisted by the mines of the Rand in 1915 amounted to 31,331,316. This is almost exactly the total of the tonnage of gold, silver, lead, zinc, and copper ores mined in 1914 in the States of Arizona, California, Colorado, Montana, Nevada, and Utah together. It is true that 1914 was not a good year for American metal mines; nevertheless to mine and treat in one district a tonnage comparable in quantity to that produced in six of America's most important non-ferrous metal-producing States is a job that claims respect. The scale, too, of operations at the individual plants is large as contrasted with ordinary mining. While there is nothing on the Rand that competes with the open-cut mining of iron and copper, or that equals the 3,898,100 tons treated by the Anaconda Copper Co. in 1914, or what the Inspiration is now achieving, the Rand is a district of big mining units. The four largest producers now are the Crown, Randfontein Central, East Rand Proprietary, and Knights Deep. How the tonnage hoisted at these mines ranks with that of a few large American properties is indicated below, all figures being for the year 1915: Randfontein Central, 2,642,357 tons; Crown, 2,558,203 tons; East Rand Proprietary, 2,006,841 tons; Knights Deep, 1,143,370 tons; Ray, 2,848,969 tons; Calumet and Hecla, 3,188,583 tons; Treadwell group, 1,652,307 tons; Homestake, 1,573,822 tons. Each mine is operated by underground methods. Such comparisons can never be pushed far, since there is always a question as to what is a mine and what a group of mines. If only the largest of the East Rand Proprietary mines were taken into account that company would rank much lower, and if the whole of the Calumet and Hecla output from subsidiaries were added that company would perhaps head the list. The latter is now mining from 17 shafts on three lodes and producing up to 11,000 tons per day from stopes extending to 5,000 feet in depth. The new mines at Juneau, Alaska, are being opened on the basis of producing 6,000 to 12,000 tons per day and the Inspiration Copper Company in Arizona is already hoisting 17,000 to 19,000 tons per day from one mine. The majority of Rand mines are content with outputs of less than 75,000 tons per month. It remains true none the less that the large mines of the Rand are really big mines and that the operations generally are on a much grander scale than those to which gold miners are elsewhere accustomed. In 1915, 53 companies mined 31,331,316 tons, and after 9.62 per cent. had been sorted out, 28,314,579 tons was turned over to the metallurgists for treatment. Of the 53 companies operating, 33 had in service 100 or more stamps.

(To be continued.)

### Sheba G.M. Co.

The following are the particulars of the Sheba output:—Tons crushed, 6,812, yielding 2,063 ozs.; working costs, £7,211; development, £1,150; estimated loss, £344; capital expenditure, £30.

There will be four long tunnels on the new railway deviation between Maritzburg and Durban. The Delville Tunnel will be 970 yards in length, and the Barrier Tunnel, which will be next in point of distinction, will be 962 yards long. The Eldorado Tunnel will be 374 yards from end to end, and the Manzine Tunnel will be 400 yards from point to point. The new line will be 300 yards longer than the existing route, but great benefit will accrue as the result of improved grades and curves.

\* In the *Mining and Scientific Press*.



### Good Hope Tin Mines.

The first annual report of the directors of the Good Hope Tin Mines, Ltd., states:—The policy of the directors, as explained at the statutory meeting, was, in view of the small amount of working capital then subscribed, to concentrate their efforts on the erecting of crushing plant, with the object of proving the value in bulk of the ore already mined and being the best guide to the real value of the lode which had not been opened up. In carrying out this policy numerous unforeseen difficulties and delays were encountered, and the expense proved to be in excess of the amount estimated, so that some most necessary development work had to be temporarily abandoned. The directors are, however, pleased to report that the crushing plant is now in working order, and the results are most satisfactory. A report from an independent mining engineer (Mr. G. H. Blenkinsop) is presented upon a trial crushing of 20 tons from the large dump of ore lying on the property. This ore had been mined from the lode, but had been picked from the richest ore for shipping to England, what was so shipped having realised over 20 per cent. of tin. Mr. Blenkinsop's report shows that, without taking into account a considerable loss in tailings owing to newness and consequent want of adjustment of the plant, a return was obtained of 11 per cent., which, taking the present value of tin, gives an actual value of the rock in the dump referred to of about £3 per ton, which, owing to the picking above referred to, is necessarily something less than the value of the lode itself, mining from which the directors hope very shortly to be in a position to resume in the workings, in which it is exposed for a distance of 200 feet, so that a very considerable tonnage can be mined from what is actually in sight. Meanwhile it is estimated that in the dump referred to and on the surface there are approximately 1,000 tons available for immediate crushing, which, with the ore in sight in the workings, is probably sufficient to keep the plant running for at least twelve months. The plant erected is capable of treating, at working one shift per day, about 12 tons of lode matter at a cost of about £14 per day; and if worked three shifts, it could treat about 30 tons per day at a cost of about £30. The foregoing particulars alone are sufficient to show the valuable nature of the property, but for its proper development and ultimate acquisition in freehold, more working capital is essential. With a view to cheaper mining and an increase in output, it is necessary to proceed with the sinking of the main shaft (stopped at 100 feet), and with the driving of the adit to intercept the lode at a lower level than the present working. In view, however, of the satisfactory nature of Mr. Blenkinsop's report, and the mine now having reached the productive stage, the directors are hopeful of placing a sufficient number of shares to provide the necessary capital, and when once this is done, they feel that the success of the undertaking will be assured. In the plant which has been erected and the work done by

the company, there is very full value for the cash expended, and it is only owing to the energy and perseverance of Mr. Allen, who has so far received no remuneration for his work (though a certain amount is provided for in the accounts now presented), that so much has been accomplished with such limited fund. The working capital shares raised to date are 11,170, representing a cash value of £5,585, and 56,730 shares of the par value of 10s. each remain for issue.

### New Patents.

109. Charles Guthrie Guthrie and Lyon Wilson Neilson.—Machine for registering the properties of length, height, "slice" or "pull" of the flight of a golf ball, the same being also applicable for indoor golf.
110. Peter Norman Nissen.—Improvements in and relating to portable buildings.
111. Arthur Alexander Crozier.—Improvements in or applicable to pneumatic tyres for the wheels of motor cars and other vehicles.
112. Edgar Rouse Sutcliffe.—Improvements relating to presses.
113. Edgar Rouse Sutcliffe.—Improvements relating to presses.
114. Arthur Henry Lynn, Lewis Adams Riley, and Niels Edward Rambush.—Improvements in and relating to gas producers.
115. Herbert Alfred Humphrey and William Joseph Rusdell.—Improvements in valves for liquids or gases.
116. Thomas Chalmers.—Improvements in apparatus for the transmission and reproduction of sounds.
117. Rhetterford Braedus Martin.—Improvements in ore concentration.
118. Rudolph Lessing.—Improvements in hydro-genation of unsaturated substances.
119. John Davies, William Henry Jones, and Joseph Davies.—Improvements in coverings or insulations for ships' decks, bulk heads, walls, floors, ceilings, and the like.
120. William Wilkie.—Improvements in apparatus for opening and pressing the seams of wearing apparel.
121. William Godson Little and Harry Morris.—Improvements in materials for the destruction of parasites on animals.
122. La Crosse Tractor Co.—Plow tractor.
123. Thomas William Stainer Hutchins.—Improvements in operating producer gas power installation.
124. Sidney John Rous.—Improvements in or relating to lock-nuts.
125. Gogn Constantinesco and Walter Haddon.—Improvements in rock-drills.
126. Henry Alfred John McLellan.—Electrically-driven gramophone motor with complete speed regulating device.
127. Ernest Arthur Kirby.—Kirby's harmless oil: Sores, cuts and wound healer and embrocation.
128. Joseph Leo Ashley.—Improvements in the production of rubber and rubber-containing substances.
129. Charles Bassett Burke.—Electrically-controlled safety gate for headgears.
130. Reuben Levi Pritchard.—Improved process and apparatus for separating fibres from bast plants and other adhering fibres.
131. Marconi's Wireless Telegraphy Co., Ltd., and Isaac Schoenberg.—Improvements in frequency multipliers.
132. John Herbert Veasey.—Improvements in automatically fed rock drills.
133. William Doran.—Automatic electric steering lights.
134. Henry Charles Wesson Brown.—Improvements in atomising spray.
135. James Burke.—A new improved specific or cure for rheumatism.
136. John Charles Barker.—Improvements in pneumatic tyres.
137. Robert Donald.—A respirator or inhaler.
138. Joseph Webb.—An improved appliance for washing gold-bearing, diamondiferous and similar ground and for disposing of the tailings.
139. Henry William Hand.—An improved egg box.

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## THE WEEK IN THE SHAREMARKET.

### Tin Stocks Firmer—Springs and Government Areas Still the Features.

On Saturday morning the volume of business increased considerably, with a partial recovery in prices. Government Areas promised well at the opening but weakened on high change, closing, however, slightly above Friday's price. Kleinfonteins indulged in another advance, while Knight Centrals swung back once more. New Modders were in demand at improved rates, and the full buying orders could not be executed. The outside stocks received very little attention, and among these New Compound Diamonds were a weak feature. After the call New Modders made a further advance and the market closed steady. On Monday morning prices were adversely affected by the Randfontein strike, the only advances on the whole list being in tin stocks and New Elands. Springs were decidedly the most active factor and were heavily sold, but as all that offered were absorbed the price firmed up somewhat. An offer was made of 61s. for a thousand at sixty days' buyer's option, but only a few were obtained at the figure. On Tuesday the panic was over and everyone seemed anxious to get back the stocks they had been so eager to part with. Prices were maintained throughout the day. Wednesday's opening was quite lively on the news being definitely known that the Randfontein trouble was over. Business was, as might be expected, mainly confined to Springs Mines and Government Areas, both at improved rates. In addition to the cash transactions, the latter were dealt in at 63s. 9d. buyer's option. At the call prices were maintained, though Randfonteins and Randfontein Deeps did not respond to the interest that might have been expected, especially the latter. There was another upward toss of Bantjes, and in this Rooibergs had a look up. In the unlisted stocks New Daggas went better at 22s. 6d. buyers, also the old shares, for which 11s. 9d. was bid. Compound Diamonds have weakened considerably and 15s. was the best bid. A sale of Henderson's Options went through at 10½d. with more offering at the price. The fully-paid stock was quoted at 3s. 6d.—5s. The Stock Exchange was closed on Thursday. The range of outside stocks during the week has been fairly large. Beyond those mentioned already, the following were enquired after: South Van Ryns from 6s. 3d. to 6s. 10d. buyers, with sales at 6s. 9d. and 6s. 11d.; Randfontein Explorations, 4s. 3d. to 4s. 9d.; Monteles, sales 92s. 6d. to 88s. 9d., closing at the latter figure; New Daggas, buyers from 21s. to 22s. 6d.; Phoenix, sales 9d.; Union Tins, 2s. to 2s. 7d.; Daggas Options, 7s. 3d. to 8s. buyers; Areachaps, 5s.—7s. 6d.; S.A. Alkali, 33s. 6d.—35s.

Friday morning's market was a weary display of inaction, the only early business being a sale of Bantjes at 8s. Monteles were quoted at 85s.—88s. 9d. At the call the turnover was very small, and the solitary sale among the favourites was one of Springs at the reduced rate of 61s. 9d. The alterations in prices were: Sales: African Farms, 7s. 9d. and 7s. 10d.; Bantjes, 7s. 11d.; Glyms, 14s.; Government Areas, 62s. 9d.; Knight Centrals, 6s. 8d.; Rooibergs, 6s.; Gold Mining Estates, 14s. Other quotations: Witwatersrand, 40s. buyers; Sub Nigels, 25s. 3d.—25s. 6d.; Swazi Tins, 28s.—30s.; Heriots, 11s. sellers; New Elands, 28s.—29s.; City Deeps, 81s. 6d.—82s.; City and Suburbans, 31s. 3d. buyers. Tin stocks are beginning to attract attention, and if only the uncertainty as to the actual state of some of the mines could be dissipated and something like a permanency of output assured, there is no reason why there should not be a substantial advance.

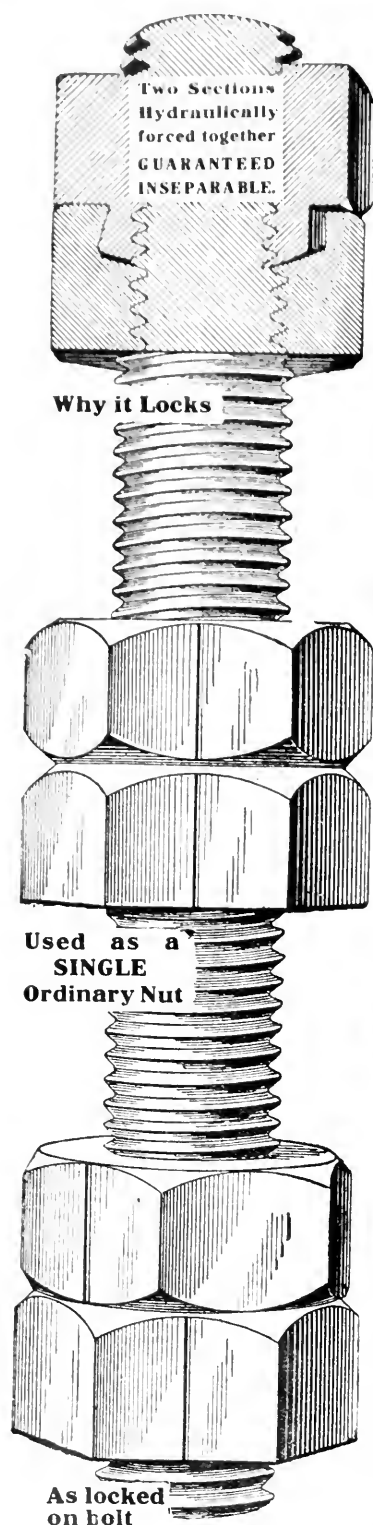
	Wed. 16th.	Frid. 18th.	Sat. 19th.	Mon. 21st.	Tues. 22nd.	Wed. 23rd.
African Farms	7 6*	—	7 8	7 5*	7 6*	7 8
Apex Mines	7 6*	7 3*	7 4*	—	7 6*	7 4*
Aurora Wests	14 9*	14 9*	14 9*	14 9*	14 9*	14 9*
Bantjes Cons.	7 5	7 9	7 9	7 6*	7 7	8 2
Brakpan Mines	100 0*	95 0*	100 0*	97 6	96 6*	97 6

\*Buyers. +Sellers. †Odd lots. nEx London.

	Wed. 16th.	Frid. 18th.	Sat. 19th.	Mon. 21st.	Tues. 22nd.	Wed. 23rd.
Breyten Collieries	—	17 6†	17 6†	17 0*	17 0†	16 9†
Brick and Potteries	—	—	5 6	—	5 0*	—
British South Africa	—	—	10 0*	—	—	—
Bushveld Tins	0 4*	—	—	0 4*	0 4*	0 4*
Cinderella Cons.	6 6	6 0*	6 0*	5 6*	5 9*	6 0*
City and Subs.	31 0*	31 0	30 6*	30 9*	31 0*	31 0*
City Deeps	83 0†	81 0†	81 0†	81 0	80 9*	82 0*
Cloverfield Mines	9 1	—	9 0	9 0*	9 0	9 10*
Clydesdale Colls.	—	—	12 6*	12 6*	12 6*	12 6*
Con. Langlaagtes	21 6*	—	24 6*	24 6*	24 6*	21 6*
Con. Main Reefs	16 0*	16 0*	—	—	—	—
Con. Mines Selection	21 9*	21 6*	21 6*	21 9	21 6*	21 6*
Coronation Colls.	—	—	—	—	—	32 6*
Coronation Freeholds	—	—	0 3	—	—	—
Crown Diamonds	—	2 6†	—	—	—	2 0*
Crown Mines Debs.	£100†	—	—	—	—	—
Durban Road. Deeps	—	—	—	—	—	8 0*
E.R. Centrals	—	—	—	9 6*	—	—
E.R. Coals	2 0*	2 0*	2 0*	2 0*	1 11*	1 11*
E.R. Minings	—	—	0 11*	—	—	—
E.R. Proprietary	—	10 0†	9 6*	9 6*	9 0†	10 0†
Eastern Golds	—	1 3†	—	—	1 1*	1 1*
Frank Smith Dmds.	4 0†	3 6*	3 3*	3 4*	3 6*	3 8*
Geduld Props.	39 9*	39 9*	39 6*	39 6*	39 3*	39 3*
Glencairns	—	1 0*	1 0*	1 0*	1 0*	1 0*
Glencoe Collieries	9 3*	9 3*	—	—	—	9 3*
Glynn's Lydenburgs	—	—	13 6*	15 0†	13 9*	13 9*
Govt. Areas	63 0	62 0*	62 6*	61 3	62 6	63 0
Jupiters	5 10†	5 7†	5 6†	5 6†	5 0†	4 3*
Kleinfontein Est.	—	20 0†	—	—	—	—
Knight Centrals	7 2*	7 0*	6 9	6 3	6 3	6 6
Knights Deeps	—	—	15 0†	—	—	—
Lace Props.	4 11*	4 10	4 10*	4 11†	—	—
Leeuwpoot Tins	13 9*	14 3	14 9*	15 6	15 6	15 3
Lydenburg Farms	6 10	6 7*	6 9	6 6	6 6*	6 4*
Main Reef Wests	4 3*	4 2	4 2	4 0*	4 1†	4 3†
Meyer and Charltons	—	106 3†	—	—	—	105 6†
Middelvel Estate	1 3*	—	—	1 0†	—	—
Middel B's	158 0†	158 0†	155 6*	154 6*	155 0	156 0
Modder Deeps	136 9*	135 6	135 6*	133 6*	134 6	135 0*
Natal Navig. Colls.	18 6*	—	—	18 6*	—	18 6*
New Boksburgs	—	—	1 6*	—	1 6*	1 6*
New Eland Dmds.	26 3*	26 6*	28 0*	29 0*	29 0*	29 0*
New Era Cons.	9 7	9 6*	9 8*	—	9 6*	9 8*
New Geduld Deeps	7 3†	6 9*	6 9	6 6*	7 0†	6 6*
New Heriots	42 0†	42 6†	—	42 6†	—	37 0*
New Kleinfonteins	17 6†	17 6	18 0†	17 9	18 0	17 9*
New Modders	422 6*	420 0*	425 0	426 3†	430 0†	430 0†
New Rietfonteins	—	—	—	—	0 10*	—
Nourse Mines	22 3*	22 0*	—	22 3†	21 9*	22 6
Premier D'ferreds	—	—	—	150 0†	150 0†	—
Pretoria Cements	88 0*	86 0*	88 6†	88 6†	90 0†	89 0†
Princess Estates	1 6†	1 6†	1 6†	—	—	1 6†
Rand Collieries	2 1*	—	2 3*	2 1*	—	2 6*
Rand Klips	10 3†	9 9*	9 10	9 9	9 9*	9 10*
Rand Nucleus	1 4*	—	1 4*	—	1 4*	—
Rand Select. Corp.	74 0	73 0	72 3*	72 0	71 6*	73 0
Randfontein Deeps	6 0†	6 0†	6 0†	—	—	5 6*
Randfontein Est.	14 9	14 6	14 6	13 9	14 0*	14 6*
Roberts Victors	—	—	—	—	—	10 0*
Rooibergs	—	5 0	4 9*	4 11*	5 0*	5 9*
Roadport United	6 0*	6 0*	6 3*	—	—	—
Ryan Nigels	2 0*	—	—	2 1*	—	—
Shebas	1 3*	1 3*	1 3*	1 3*	1 3*	1 3*
Simmer Deeps	3 0†	2 3	3 3†	—	—	—
S.A. Breweries	29 0†	29 0†	—	29 0†	29 6†	29 6†
S.A. Lands	4 1*	4 1*	4 1	—	4 0*	4 0*
Springs Mines	62 3	61 3	61 3	60 0	61 6	62 1*
Sub Nigels	25 3*	25 0	24 6*	24 6*	24 6*	25 0*
Swaziland Tins	25 0*	25 0*	25 0*	26 0*	26 0*	26 3*
Transvaal Lands	10 3*	10 0*	—	10 6*	—	10 0*
Trans. G.M. Est.	13 0*	13 0*	13 0*	13 0*	13 0*	13 0*
Van Dyk Prop.	1 0*	—	—	—	—	—
Van Ryn Deeps	66 0*	65 6	65 6	65 3	65 9	65 9
Van Ryn Estates	—	—	—	—	37 6†	—
Village Deeps	24 0*	24 0*	24 9*	24 0*	24 0*	25 0*
Village Main Reefs	14 0*	14 0*	—	14 0*	—	14 6*
West Rand Cons.	5 6*	5 6*	8 0†	—	5 6*	5 6*
Western Rand Est.	—	—	—	1 9*	—	—
Witbank Colls.	43 0*	43 0*	43 0*	43 0*	43 0*	43 0*
Witwatersrands	—	41 0	—	—	42 0†	38 6*
Wit Deeps	14 0†	—	—	—	—	—
Wolhuters	8 9*	8 9	8 8*	8 8*	8 8*	8 8*
Zaaiplaats Tins	7 8	7 9	7 7	7 6*	7 8	7 9

Union 5 per cents.: 18th. £99 16s. 3d.†; 19th. £99 16s. 3d.†; 21st. £99 17s. 6d.†; 22nd. £99 17s. 6d.†; 23rd. £99 17s. 6d.†.

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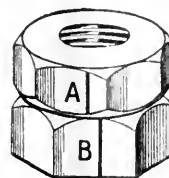
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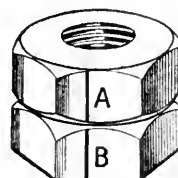
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# Engineering Notes and News.

## NOTES ON MINING ROPES.

[By H. R. SMITH, A.M.I.M.E.]

In any class of mine in which the mineral gotten is wound to the surface up a shaft, the capital invested may be regarded as divided into that employed above ground and that employed below ground, with the important factor that the commercial success of the mine depends to a great extent on the connecting link between the two. That connecting link is the winding rope.

It is by no means uncommon to see a mine well equipped with efficient and economical winding engines, a beautifully straight shaft, elaborately bricked, headgear of the latest type, gearing, cages, electric and signalling apparatus the best of their respective kinds, all representing an enormous outlay, while often the essential factor in the life of the mine—the winding rope—is more or less an unknown quantity. On it depends not only successful working but the lives and limbs of all those whose work carries them underground. The essential points to be considered in a winding rope are (1) its life, (2) the factor of safety and the consequent breaking strain, (3) the size of pulleys and drums, (4) the speed of winding, acceleration, kinetic shock, and the resultant fatigue of the rope. No. 2 has, of course, an important bearing on 1, 3 and 4. Taking the six-strand type of rope—which is most generally used—the compression of the strands over the central core is usually (in well-made ropes) so uniform that when a short length is taken and suitably held in the jaws of a testing machine with a good grip, the individual wires compressing on a common centre can be reasonably relied upon to give a specified breaking strain. Where, however, there is—as is the case in actual working practice—a torsional effort on the rope when the strain is on in winding for instance, then the matter assumes an entirely different aspect, and there arise the physical effects of strains and stresses. These points are important, and call for careful consideration. The six-strand ropes being flexible and made with a twisted strand, never run in a dead fixed travel. In every winding gear there are three determining factors, viz., the cage, the headgear, and the drum, and they in turn form two distinct sections in the rope. At the commencement of every wind upwards there begins a rotating movement in the rope as it passes over the headgear pulley. Now the end at the cage being fixed, it will be seen that the effect of this, as the cage approaches the top of the shaft, is that a tightening twisting movement is accumulating in the rope, which causes excessive compression on the central core, while at the same time, in addition to the outside skin friction over the headgear pulley, the internal stresses on the wire in this section are increased, and internal friction is also having its effect. On the section of the rope which has already passed the headgear pulley, the rope strands have a corresponding tendency to “unlay,” and while the internal skin friction is not so intense as in the former cases, it is there in varying degree. On the downward load this operation is reversed, and it should be realised that the first serious result of this action on the rope is a heavy torsional strain consequent on the rotation set up in the rope. Speed of winding, kinetic shock, and acceleration may be combined in one explanation. Each time the cage is raised there is a sudden tremor set up at the point of load contact, which travels throughout the whole length of the rope. After the first shock has passed, a further set of vibrations is set up by the rate of acceleration, and continue increasing until the maximum acceleration is obtained, then, gradually dying off until the normal rate of pull is reached, becomes constant. As the engine is slowed down preparatory to the cage reaching the pit-head, the stresses are modified, and continue until the cage

becomes stationary, when an altogether different set of vibrations is set up. The accumulated effect of these varieties of shocks is the gradual destruction of the nature of the steel in the rope by crystallisation or molecular change in each separate wire unit, until in the course of time the rope may become so “fatigued” that a breakage results. Another important consideration is the bending movement, which has the action of varying the strain on different portions of the section of each individual wire. As each section of the rope passes over the pulleys or drums, there occurs a combined increased tensile stress on the outer arc and a decreased stress on the inner arc of the wires, together with a skin friction on each wire, and a rolling movement of the rope as a whole. It will therefore be apparent that from the very moment a winding rope is put to work every known form of mechanical friction is set up, which commences its full action of deliberate destruction of the rope. It is of the utmost importance therefore in considering the type, make, and construction of a wire rope, that due regard should be paid to the quality of material that is used in its manufacture. The most generally known steels used in the manufacture of wire ropes are specified in the purely trade names of “steel,” “best special,” or “improved” and “plough steel” or similar description. These, however, to the lay mind, have little or no significance, but it behoves the engineer to demand more than a named steel and a breaking strain; to call a steel a “plough” quality merely because it gives a high breaking strain is a misnomer. It is quite an easy matter for a wire-maker to draw a comparatively low-carbon steel up to a high breaking strain, or to increase the carbon temper of a lower grade quality of steel. In such a case tensile strain is obtained at the expense of other necessary qualities. It is in the interest of every engineer, in placing orders for wire ropes, to consider the following important considerations:—(1) The type of the rope, governed by the size of the drum and pulley, the speed of winding and the acceleration. Given this information, the rope-maker may be safely relied upon to recommend a suitable construction. (2) The breaking strain of the rope should be taken as a whole, and not as an aggregate of the wires. (3) The actual number of torsions each wire will give in a standard engineering length of 8in. (4) The actual number of bends of 180 deg. which the wire will give over a standard radius before breaking. (5) The fracture of the wire should be clean and free from defects of a structural nature. (6) The reputation and experience of the firm with whom it is proposed to place the order should enter largely as an important point. Finally, price should never be a governing factor in deciding the purchase of a rope. The best ropes are cheap compared to the rest of the plant; on the other hand, accidents are dear and lives are valuable. Accidents, moreover, give a mine a bad reputation amongst the workmen. They stop its productive power, increase oncost charges, decrease dividends, and cause general inconvenience and annoyance. The efficiency of the mining ropes should therefore be most carefully considered.

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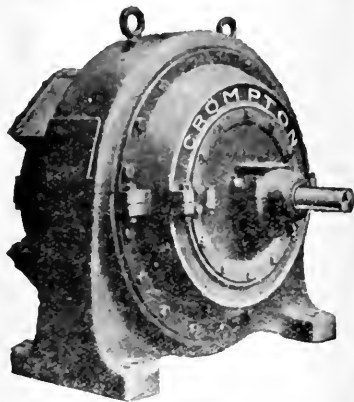
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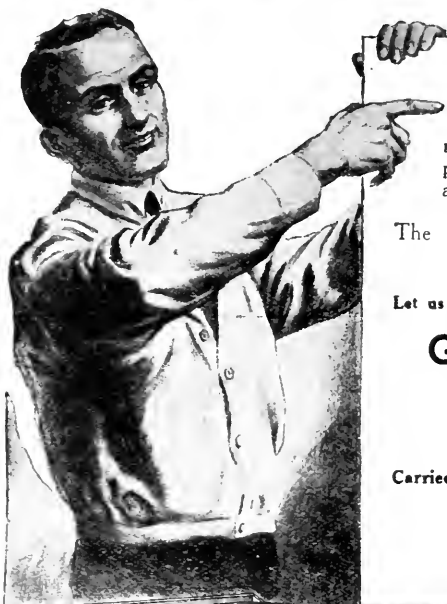
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## THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

**Conditions Altering in Methods of Dealing—Wire Ropes Sent to Kimberley—Electric Light Connections Reviving—Interim Market Report for Oil and Colour Trade—Labour Questions.**

BUSINESS on the Commercial Exchange is exceptionally quiet, as the mine requisitions are meagre to a degree, as they only contain, as a rule, sorting-up lines, such as bolts, nuts, packings, ropes, machinery spares, shovels and daily consumable stores. However, there is a reason for this apparent leisure on the Exchange, as the war conditions have altered much of the normal procedure as between the mines and the merchants. The fact is that the contract system came more into vogue, even in the early days of the war, when contracts were made for the supply of mercury and other mine chemicals; also timber, mining poles, drill steel and others of the higher class kinds, essential for mine work. For example, the timber ships recently unloaded at Delagoa Bay were chiefly for the purpose of fulfilling contracts, therefore the timber went into the mine yards straight from the ships. These contracts were made for very substantial quantities, and some were entered into for the period of the war, therefore it is not surprising that the mine buying lists are of a meagre nature, whereas under normal pre-war conditions the material now under contracts would appear in the daily and monthly requisitions. Hence the apparent inactivity does not mean that the capacious requirements of the mines are not being fulfilled.

### THE TREND OF BUSINESS.

The important subject of our merchants allowing their stocks to be unduly depleted was touched upon last week. The complaint is that huge quantities have been supplied to diamond mines particularly, and in a lesser degree to outside mines, more especially Rhodesia. In doing this the Committee of the Chamber of Mines lost much of the

control, as they can only recommend replenishment of the material actually supplied and consumed by the mines on the Witwatersrand. Hence anything going to other mines is a loss to the Rand. The merchants somewhat resented this wholesale charge of recklessness, therefore a small party immediately concerned had a round-table talk, when it was found that things had been much exaggerated. One of the questions discussed was as to why so many of our wire ropes had been sent to Kimberley, when it was explained that the great majority of these were not suitable for complying with the regulations now existing for machinery on the Rand, having originally been brought here by ox-wagon before the railway era. A representative then quickly remarked that the sooner the ropes were returned by ox-wagon the better for all concerned. The merchants, however, convinced the mining representatives that so far all their requirements had been supplied, and with the assistance of substitutes and the local private engineering shops there was no reason to anticipate anything really acute for several months to come. It is satisfactory to know that this impromptu meeting cleared up several matters that only required the proper explanation. In most cases what has happened is that representatives have been here from all parts and bought much of the material and machinery not suitable for the up-to-date operations on the Rand and so cleared out the merchants' stores of what at one time seemed derelict goods.

It is marvellous that business has kept up so well, as undoubtedly the Russian affairs, as well as the submarine menace, created a gloom over all commercial circles in

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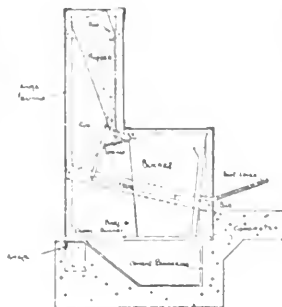
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# Improved Sanitation Underground on the Rand.

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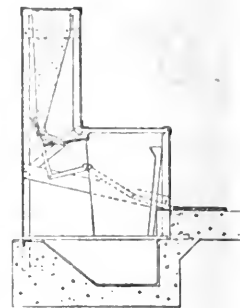
SECTION showing Hopper and Gearing in position of rest, or immediately after foot lever has been released.

The O'BRIEN Premier Dry Earth Closet System has undoubtedly proved itself to be the PREMIER of all dry earth systems, and only requires to be known on the mines to secure its general adoption.

THE PRINCIPLE OF THE SYSTEM IS THE SEPARATING OF THE LIQUID FROM THE SOLID OR FECAL MATTER, which is done by mechanism inside the pan. The Liquid is run into a chamber under or near the pan, which chamber is partly filled with a chemical absorbent preparation, and combining with the preparation thereby forms A PERFECTLY PURE, ODOURLESS SOLID, or by other means treated and allowed to flow away pure. The fecal matter in the pan is automatically covered with a chemically prepared ash, rendering it absolutely odourless, and can be hoisted to the surface and carted away in open carts during the daytime.

The system itself is far superior to any other dry earth system, and has been largely ADOPTED BY THE SOUTH AFRICAN RAILWAYS and by the NEW SOUTH WALES GOVERNMENT FOR ALL BUILDINGS where no sewerage scheme is in use, also by MANY LEADING PUBLIC GENTLEMEN OF SOUTH AFRICA. In simplicity, cleanliness, and convenience it is far ahead of present practice.

Messrs J. T. DITCHFIELD, LTD., will be happy to enter into Special arrangements with Mines, Municipal and other Public Bodies, and, on application, will furnish estimates, and, if required, designs for the installation and maintenance of the system.



SECTION showing Hopper and Gearing in position while in use.

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Johannesburg during the earlier part of this month. The cloud has, however, lifted very much, on the more reassuring news from both quarters.

#### ELECTRIC LIGHT CONNECTIONS.

There is also more reassuring news for builders in reference to obtaining new connections for electric light. There is nothing official available at present, but an architect states that applications can be put in for electric light connections for those buildings that were in the course of erection on February 10 last, when the electric light applications were suspended. This revival has given rise to exaggerated reports, which is only to be expected, until something official is forthcoming. Even the architect in question, on the strength of getting orders for a plan or so, jumped to the conclusion that electric light would be freely forthcoming, but upon putting the question to the test he became less enthusiastic. Nevertheless, it is a step in the right direction that some relaxation of the stop regulation is forthcoming. It appears that an extra charge will be made for connections where it entails extra cost in laying a new cable, etc. This alteration has been made possible by the municipal authorities overhauling the electric light position with a view to economising, as they have cut out lots of street lamps and large arc-lamps used by certain firms, and it is said that relief can be obtained through a rearrangement of the tram service, on some sections, during the evenings. In addition to these economies, some electrical power machinery, as well as cables, have been secured from the various other municipalities in South Africa, which assists matters very substantially.

#### THE OIL AND COLOUR TRADE.

An interim market report has been issued by a leading firm, dated May 23. The principal extracts are:—“We are faced to-day with a very serious position as regards further supplies of white lead, oil and brushware.

“*White Lead*.—Since the cabled report that lead and lead products were prohibited, speculation has been rife, and the price reached was 90s. per 100 lbs. in town, but has since subsided to 85s., but our supplies are now nearly exhausted. We have a few tons arriving in June and hope to have news by next mail of further shipments on the water. The maximum amount that we can spare each customer is 200 lbs. until further notice, at 85s. per 100 lbs. nett.

“*Linseed Oil*.—Supplies are scarcer than white lead. The price has risen enormously in England, and the cost of iron drums has been a great factor in the increased cost. We have not received any shipments since January, and only the large stocks that we held have enabled us to keep our customers supplied. Stocks are very short in town and prices have been ruling from 37s. 6d. to 40s. per five O.M. gallon drums. The maximum order we can supply any customer until further notice is 10 gallons at 39s. 6d. per five O.M. gallon drum.

“*Brushware*.—The position as regards brushware has become well-nigh hopeless. We have not received any shipments since Christmas, and from reports received, scarcity

of bristles, shortage of labour in England, and difficulty in obtaining wood for handles, is going to make the matter of supply at any price difficult.

“*Sandrics*. The prices of glue, ripolin, paints in oil, putty, resin, caustic soda, etc., are all advancing in England, and any goods packed in kegs or tins are becoming impossible to procure.

“*Turpentine*. The price to-day is 54s. 6d. per case 2.5 O.M. gallons tins, and 59s. 6d. per case 10.1 O.M. gallon tins. It is doubtful when new shipments will arrive.

“*Varnish and Stain*.—Prices remain the same, but we are experiencing great difficulty in procuring supplies owing to tins. Our advice to our customers is ‘buy only for your present needs.’ Any attempt to lay in heavy stocks will only force the prices up higher.”

#### LABOUR QUESTIONS.

The Randfontein white miners' strike has finished on the terms practically offered originally. Engineering fitters, also moulders, are busily engaged, and few, if any, men well up in their trade need be idle. It is a little different with carpenters and bricklayers, who are not exactly in want of jobs, but seemingly there are always a number available, as they put in an appearance when new contracts are started. The recruiting has taken away much of the surplus of building workmen. According to the Government Labour Bureau, there is an enquiry from the Rhodesian Railways for firemen with a decent record. The reason given is that so many of the young fellows went away to the front.

#### VARIOUS TRADE ITEMS.

The British Government are acting most generously in keeping the dynamite factories in this country supplied with a three months' stock of glycerine. The Rhodesian mines are more than ever depending upon our engineering shops for repairs and new castings and mine material work of every kind. Johannesburg and Reef foundries are so well engaged that the public holidays are worked through. Flat galvanised iron is getting scarcer and scarcer.

*Electrical Goods*.—There are ample stocks of 3.22 wire, but other sizes are scarce. Porcelain ware is pretty well absorbed, without much hope of replacement. The Government are giving work to engineering firms to put threads on certain electrical apparatus in connection with the once-discarded pattern where cement was used, and now a thread and nut is the *modus operandi*. An ever-expanding industry is springing up in Johannesburg and other towns for making boxes and cases from all kinds of packing receptacles for eggs, cigarettes, jams, fruit, potatoes and other things which must be packed before the railway will accept. In one factory alone in Johannesburg 1,000 cases and boxes of every description is the ordinary daily output, and, what is more, is that South African poplar and pine woods are used. These arrive here in the rough, cut in suitable lengths

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and then handle it from start to finish in one of our factories. The work costs £3 per ton as compared with 37s. 6d. in two works.

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Iron, imported 1  $\frac{1}{2}$  round, 40s. to 45s.;  $\frac{1}{2}$  up to 1 in., 37s. 6d.; 2 in. to 6 in., 30s. per 100 lbs. Ditto, square, up to 1 in., 30s.; 1  $\frac{1}{2}$  in. to 2  $\frac{1}{2}$  in., 25s.; 2  $\frac{1}{2}$  in. to 5 in., 25s.; flats, 3  $\frac{1}{2}$  in. to 4 in., all from  $\frac{1}{2}$  in. up, 40s.; angles,  $\frac{1}{2}$  in. to 3  $\frac{1}{2}$  in., 37s. 6d.;  $\frac{1}{2}$  in., 37s. 6d.; 5  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in., 30s., excepting 5 x 4 x 2 in., mild steel bar, 4  $\frac{1}{2}$  lb.; drill, 7  $\frac{1}{2}$  lb.; steel plates, 10 ft. by 4 ft. by 1  $\frac{1}{2}$  in., 50s.;  $\frac{1}{2}$  in. by 3  $\frac{1}{2}$  in., 50s.;  $\frac{1}{2}$  in. to 5  $\frac{1}{2}$  in., 40s.;  $\frac{1}{2}$  in., up to 10s.; 10 ft. by 5 ft. by 1  $\frac{1}{2}$  in., 45s.;  $\frac{1}{2}$  in. and 3  $\frac{1}{2}$  in., 42s. 6d. to 45s.;  $\frac{1}{2}$  in. to 5  $\frac{1}{2}$  in., 37s. 6d.;  $\frac{3}{4}$  in., up to 35s.; intermediate sizes up to 12 ft. by 6 ft. by 1  $\frac{1}{2}$  in., 42s.;  $\frac{1}{2}$  in. and 3  $\frac{1}{2}$  in., 31s. 6d.;  $\frac{1}{2}$  in. and 5  $\frac{1}{2}$  in., 33s.;  $\frac{1}{2}$  in. and up, 32s., all at per 100 lb.; hexagon and cuphead bolts,  $\frac{1}{2}$  in. dia., 1s. 9d. lb.; 5  $\frac{1}{2}$  in. dia., 1s. 6d. lb.;  $\frac{1}{2}$  in. dia., up to 3 in. long, 1s. lb.;  $\frac{1}{2}$  in. dia., 1  $\frac{1}{2}$  in.; 3  $\frac{1}{2}$  in. and up long 1  $\frac{1}{2}$  lb.;  $\frac{1}{2}$  in. dia., up to 2  $\frac{1}{2}$  in. long, 62s. 6d. 100 lbs.;  $\frac{1}{2}$  in. dia. and 2  $\frac{1}{2}$  in. up long, 60s. 100 lbs.;  $\frac{1}{2}$  in. dia., up to 2  $\frac{1}{2}$  in. long, 55s. 100 lbs.;  $\frac{1}{2}$  in. dia., 2  $\frac{1}{2}$  in. and up long, 52s. 6d. 100 lbs.;  $\frac{1}{2}$  in. dia.,  $\frac{1}{2}$  in. dia., up to 2  $\frac{1}{2}$  in. long, 52s. 6d. 100 lbs.;  $\frac{1}{2}$  in. dia., 2  $\frac{1}{2}$  in. and up long, 50s. 100 lbs.;  $\frac{1}{2}$  in. and 1 in. dia., same price as  $\frac{1}{2}$  in. diameter; nuts,  $\frac{1}{2}$  in., 1s. 3d. lb.;  $\frac{1}{2}$  in., 65s.;  $\frac{1}{2}$  in., to 1  $\frac{1}{2}$  in., 62s. 6d.; 1  $\frac{1}{2}$  in. and 1  $\frac{1}{2}$  in., 70s.; 1  $\frac{1}{2}$  in. to 1  $\frac{1}{2}$  in., 75s.; 2 in. up, 85s.; washers, all sizes, 45s.; rivets, 3  $\frac{1}{2}$  in., 1s. 6d. lb.;  $\frac{1}{2}$  in., 5  $\frac{1}{2}$  in., 1s. 3d. lb.; 7  $\frac{1}{2}$  in.,  $\frac{1}{2}$  in., 9  $\frac{1}{2}$  lb.;  $\frac{1}{2}$  in., 52s. 6d.;  $\frac{1}{2}$  in., 50s.;  $\frac{1}{2}$  in. up, 49s. 100 lbs.; shoes and dies, 32s. 6d. to 35s. per 100 lbs.; rails, £23 per ton; picks, 4 lbs., 27s. per doz.; shovels, 32s. 6d. to 50s. per dozen; drill hammers, 5  $\frac{1}{2}$  lb. to 6d. lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 7s., 30 in., 9s. 6d., 36 in., 13s., per dozen; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 1s. 6d., 11 ft. 1s. 6d., 12 ft. 1s. 6d.; 26 gauge, 6 ft. to 8 ft. 1s., 9 ft. and 10 ft. 1s. 6d.; flat galvanised, 18 to 24 gauge, 75s.; 26 gauge, 72s. 6d. 100 lbs.; floor brads, 40s.; ceiling, 12s. 6d.; wire nails, 37s. 6d. to 55s. per 100 lbs.; solder, 50 per cent., 1s. 6d. per lb.; locks, rim, 54s.; mortice, 60s. dozen; barbed wire, 26s. to 30s. 100 lb. coil.

Timber: Deals, Baltic, 9 x 3, short and medium, 1s. 2d.; longer lengths, 1s. 2  $\frac{1}{2}$  d. to 1s. 3  $\frac{1}{2}$  d. (Oregon, 1s. 1d.); flooring, 1  $\frac{1}{2}$  x  $\frac{1}{2}$  and 6 x  $\frac{1}{2}$ , 7  $\frac{1}{2}$  d. to 7  $\frac{1}{2}$  d. per sq. ft.; do., 4  $\frac{1}{2}$  x 1  $\frac{1}{2}$ , 9  $\frac{1}{2}$  d.; and 6 x 1  $\frac{1}{2}$ , 9  $\frac{1}{2}$  d.; ceilings, 6 x  $\frac{1}{2}$ , 3  $\frac{1}{2}$  d. to 4d. per sq. ft.; Oregon, 4 x 1  $\frac{1}{2}$  d.; pitch pine, 8s. 6d. per cub. ft.; Oregon 6s. 3d. to 6s. 6d. per cub. ft.; clear pine,  $\frac{1}{2}$  in. x 12 in., 8  $\frac{1}{2}$  d. per ft.; 1 in. x 12 in., 9d. to 10d.; teak, small planks, 14s. 9d. per cub. ft.; do., large, 15s. 6d.; jarrah, 9s. 6d. per cub. ft.; poplar, 1 in. x 12 in., 10  $\frac{1}{2}$  d.; scantling, 1s. 2d. to 1s. 3d. per ft., 3 x 2.

Bricks, cement, lime, etc.: Cement, nominal, 31s. 6d. per cask; Pretoria Portland, 9s. 3d. per bag; 8s. 3d., truck loads; lime, white, 7s. 9d.; truck loads, 6s. 9d.; slaked, do., 5s.; blue, 3s. 3d.; plaster lime, 4s.; bricks, stock, delivered, 37s. 6d. to 45s.; wire cuts, 50s. to 70s., pressed 70s. to 80s. per 1,000, road transport difficult to obtain; salt and white glazed bricks, £27 10s. per 1,000; tiles, roofing, £17  $\frac{1}{2}$  square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6 ft. plain, 22s. 6d., fluted, 24s.; fireclay bricks, £9  $\frac{1}{2}$ , good average, per 1,000; clay chimney pots, 80s. per doz.; fire clay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass. Linseed, raw and boiled, 35s. to 37s. 6d. per five galls.; white lead, 80s. to 85s. per 100 lbs. (big lots are not quoted); turpentine,



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Chemicals: Mercury, £40 per 75 lb. bottle; bichromate potash, 3s. 6d. lb.; chlorate, 4s. 6d. lb.; permanganate, 12s. 6d. lb.; alum, 5d. lb.; carbolic acid, 8s. 6d. lb.; borax, 87s. 6d. 100 lbs.; cyanide soda, 1s. 5d. lb.; hypo, 9d. lb.; acetate lead, 77s. 6d. 100 lbs.; litharge (assay) 72s. 6d., (commercial) 58s. 6d. 100 lbs.; zinc sheets and blocks, 1s. 6d. lb.; plumbago crucibles, 5d. per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 24s. to 27s. wholesale, and 30s. to 36s. dozen retail; carbon lamps, 10s. 6d. dozen; pure rubber flex, 6d. to 8d. per yard; 3  $\frac{1}{2}$  20 coils of wire, 30s. to 33s.; do., 3 22, 23s. 6d.; tubing, 18s. to 20s. 100 ft.; keyholders, 6s. to 7s. 6d. each; round blocks, 3  $\frac{1}{2}$  in., 3s. 6d. doz.; lamp holder cord grips, 13s. to 15s. per dozen; switches, 5 amp., 24s. to 30s. doz.; British glass shades, 24s. to 36s. doz.; porcelain shackles, 15s. to 18s. dozen; do., bobbins, 12s. 6d. to 14s. per 100; cleats, 20s. per 100; P.O. insulators, 18s.; motor, 3 h.p., about £35 to £37, new.

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## The Week's Meetings.

### KNIGHT CENTRAL.

The 20th ordinary general meeting of shareholders in the Knight Central, Ltd., was held on May 18 in the board-room, Cullinan Building. Mr. A. G. Gill presided, and there were also present Messrs. S. M. Nelson, M. Honnet, W. S. Saunders, E. Rotinschild, A. Sprinz, G. W. Johns, W. H. B. Frank, A. Lipman, R. A. C. Kerns, V. Ryan, and H. G. L. Panchaud (secretary), representing 32,918 out of an issued capital of 900,000.

#### The Chairman's Speech.

The Chairman said:—The information contained in the financial statements and the reports attached thereto form a complete record of the company's operations for the year that ended on the 31st December last, so I shall confine myself to but a brief reference to such points as will bear amplification. The profit for the year amounted to £23,265, and if you add to that interest and sundry revenue, £4,097, you get a total of £27,362; but against that you have capital expenditure, £51,440; miners' phthisis compensation, £3,024; English income tax, £547; and auditors' fees, £210; so for the year expenditure shows an excess of £27,919 over revenue. You will have seen from the consulting engineer's report that the small working profit was due to the yield being lower by 40, and the costs higher by almost 1s. The increase in costs is attributable mainly to the war, whilst the lower yield is accounted for by the larger percentage of ore obtained from reclamation. The capital expenditure may appear to you to be somewhat high, but shaft-sinking and stations absorbed £33,652; machinery and plant, £7,973; and buildings, £10,677. The only item that calls for comment is the expenditure on buildings, so it is as well to explain that most of the money was spent on new cottages for the employees. Your directors had reluctantly shelved this expenditure in the

past, because they wished to retain as much money as possible for the development of the property, but the necessity for housing accommodation became so pressing that the necessary vote was passed. The development results for the year were most disappointing, as the percentage of payability was so small that the ore reserves were reduced to 296,500 tons—a decrease of 109,000 tons as compared with the position at the 31st December, 1915. There is also a fall in value of .19 dwt. Since the close of your financial year, development results on the whole have continued unsatisfactory, but you will see from the following figures, if you will study them in conjunction with the plan that is attached to the report and statement of accounts for the year under review, that at certain points south of the dyke there has been some improvement. It is only right, however, to point out that the footage driven so far is too small to justify the assumption that large payable zones occur south of the dyke.

#### FROM EAST AUXILIARY WINZE.

	Driven and sampled, feet.	Average dwts.	Estimated stopping width, inches.
18th level—			
East drive, M.R.	175	9.0	60
West drive, M.R.	125	3.3	50
19th level—			
Drives, S.R.	40	8.1	60
Drives, M.R.	75	4.8	50

#### FROM WEST SUBSIDIARY SHAFT.

17th level—			
West drive, S.R.	35	3.8	68
East drive, M.R.	95	1.7	85
18th level—			
West drive, M.R.	95	7.0	80
East drive, M.R.	20	4.1	50
East drive, S.R.	145	2.5	52

In view of the unsatisfactory position of the ore reserves and the discouraging results obtained from development operations, you will realise more than ever that by adhering to the policy of conserving the company's funds it becomes possible to explore the mine to the best possible advantage. You will have noticed from the directors' report that 62 of the company's employees were on active service, and that two of these—Messrs. W. Dodds and R. Robertson—have unfortunately lost their lives. I have no doubt that you will all join with me in extending to their relatives and friends our deepest sympathy in their sad loss. There is one other point to which I wish to refer, and that is the correct, though unofficial, announcement that appeared in the Press a little while back, to the effect that the administration of the mine that constituted the Neumann Group will pass into the hands of the Central Mining and Investment Corporation, Limited, as from July 1 next. The death of Sir Sigmund Neumann, who was the sole partner in the firm of S. Neumann and Co., rendered a change inevitable and I feel sure you will all agree with your directors, who have considered and approved of the change of control, that it is a matter of congratulation that the affairs of your company will in future be safeguarded by the Central Mining and Investment Corporation, Ltd. I now beg to formally move the adoption of the reports and accounts as submitted.

In reply to a shareholder, the Chairman said it was impossible for him to say whether the mine would have to be closed down. Unless development results improved the financial position would become such that shareholders would have to face the closing down of the mine. South of the dyke there was an improvement, but whether it would be lasting or not he could not say.

The report and accounts were adopted. The retiring directors were re-elected. Messrs. C. L. Andersson and Co. and Mr. Charles Stuart were reappointed auditors.

### Imperial Preference and "Fixed Exchange."

In a letter to "The Times" recently a correspondent anticipating the form of Imperial preference which will be "our accepted policy in the near future," contends, and rightly contends, for the "fixing" of exchange within the Empire, "which would greatly assist the granting of preference to the Dominions and the Colonies, give a new incentive to trade within the Empire, and facilitate the development of its resources." There seems to be no reason why the manufacturer, the merchant, or the producer in any part of the Empire should be hampered in the making of his contracts, or why he should be at a disadvantage when receiving cash in payment for his goods by loss in exchange, any more than traders within the United Kingdom. It is to be borne in mind that the rates of exchange between the United Kingdom and other parts of the Empire, and also between the Dominions and Colonies themselves, are dependent from day to day upon the debts which are due for settlement between place and place, whether the debts are in sterling, or dollars, or rupees. Variation in the denomination of currency is not in itself the cause of fluctuations in exchange, although uniformity would greatly tend to simplification, and, therefore, to encouragement of trade. In the case of interchange of goods between the Dominions and the Colonies, the settlement for which may take place in London, there is the double exchange, which adds to the complications and uncertainties of the trader. In the case of raw materials, loss on exchange is accentuated by heavier crops and other trade conditions, so that the burden of the conditions created by the many falls upon the shoulders of the individual or of the few. In order to establish "fixed exchange," a central institution, representative of the Imperial Government, with branches in the principal cities of the Empire, must (it is urged) be prepared to buy exchange at par value whenever, owing to the conditions of trade at the moment, the supply of exchange at any one point is in excess of the demand. In the case of reverse conditions the central institution must be similarly prepared to supply exchange at par. An extension of the banking system of the Mother Country to the Colonies would (the correspondent adds) reduce the functions of such a central institution to a fine point, and the question of exchange would resolve itself into one of rate of interest or discount and charges.

### Zaaiplaats Tin.

The results for the month of April, 1917, are as follows: Days run, 27; ore milled, 2,669 short tons; residues re-treated, 289 short tons; concentrates won, 35 long tons; average value of concentrates, 70 per cent. metallic tin; estimated profit for the month, excluding Government taxes on profits, £444 15s. 1d.; add adjustments in respect of estimated values of previous shipments, £209 10s. 9d.; profit declared for the month, £651 6s. 1d.; capital expenditure, nil. Note.—Revenue for the month has been calculated on the basis of tin at £210 per ton.

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J. WEIGHTON, Secretary.

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Johannesburg,  
April, 1917.

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